http://dx.doi.org/10.4314/bajopas.v8i2.7

Bayero Journal of Pure and Applied Sciences, 8(2): 29 – 33
Received: October, 2015
Accepted: November, 2015
ISSN 2006 – 6996

PREVALENCE OF PARASITIC GASTROINTESTINAL NEMATODES OF SMALL RUMINANTS AT JALINGO ABATTOIR, TARABA STATE, NIGERIA

[1]*Ardo, M. B. and [2]Bitrus, I.
[1]Department of Animal Science & Range Management, Modibbo Adama University of Technology, Yola Adamawa state, Nigeria.
[2]Department of Animal Health, College of Agriculture,Jalingo, Taraba state Nigeria.
*Correspondence Author: ardofuty@yahoo.co.uk +2348034964952

ABSTRACT
A cross-sectional study was conducted from December, 2014 to May, 2015 on 914 animals (345 sheep and 569 goats) at Jalingo abattoir, Taraba State, Nigeria based on faecal examination. The objective of the study was to determine the prevalence rate of parasitic gastrointestinal nematodes in slaughtered small ruminants according to thespecies, age and sex of the animals. A total of 914 faecal samples were examined by Simple Floatation Test Tube Technique, 390 (42.7%) were infested with parasitic gastrointestinal nematodes. The species of nematodes were Haemonchus, Osophagustomum, Strongyloids, Ostertagia and Trichostrongyle. Out of the 345 sheep and 569 goats examined during the period, 144 (41.7%) and 246 (43.2%) were infected with parasitic gastrointestinal nematodes respectively. There was no statistical significance (P>0.05) on the prevalence of the infection between the species. Out of the 306 and 371 adult sheep and goats examined, 136 (44.4%) and 175 (47.2%) were infected respectively. Among the sheep and goats examined, the adult was found to be more infected than the young. However, infection rates among the young animals of both species was statistical significant (P<0.05). According to the sex, out of the 120 rams and 375 bucks examined, 44 (36.7%) and 164 (43.7%) were infected respectively. Out of the 225 ewes and194 does that were examined, 100 (44.4%) and 82 (42.3%) were infected respectively. There was no statistical significance (P>0.05) among male and female animals. These results show that parasitic gastrointestinal nematode was prevalent in both sheep and goats at Jalingo abattoir and all the parasite eggs detected were strongyle type. Hence, further laboratory examination is recommended to identify parasite species in order to design appropriate control measures.
Keywords: Gastrointestinal nematodes, Jalingo Abattoir, Prevalence, Small ruminants, Taraba State

INTRODUCTION

Small ruminants are very important in human nutrition and in both urban and rural economies and have the potential of serving as tools for poverty reduction in Nigeria. They play a vital role in rural economies through provision of meat, milk, household income, manure and skin. Sheep and goat contribute a large proportion of readily available meat in the diet of pastoralists. Although small ruminants represent great resources for the nations, the productivity per animal is low (Okorafor*et al,* 2015).

The ruminants play significant roles in the social and economic wellbeing of the Nigerians in various ways. Economically, the animals serve as sources of income earning to major ruminant's dealers- sellers of live animals and butcher's/meat sellers; generates employments and creates markets for larger number of people who explore the animal's products and by-products for economic gain (Lawal-Adebowale, 2012). The ownership of small ruminants is regarded as an investment; they are sold to meet compelling family financial obligations or slaughter for consumption at home or during festivities (Ademosun, 1988).

Sheep and goats have great economic potentials as a result of their high fertility, early maturity and easy adaptability to both humid and semi-arid environment (Ademosun 1988).

These animals (Sheep and goats) constitute a major source of animals in Nigeria and their widespread distribution in most rural communities and the ease of management by both children and women who provide the bulk of labour in small holder family farms in Nigeria make them easily adaptable (Madu*et al*; 2005).

The production of these animals (Sheep and Goats) is being reduced by a number of factors and one among them has been recognized as helminth parasitism. These are responsible for a number of economic losses in a variety of ways as losses through lower fertility, reduced work capacity, involuntary culling, a reduction in food intake, lower weight gains, milk and meat production, treatment costs and mortality in heavily parasitized animals (Carmichael, 1972; Akerejola*etal.*, 1979).

Nematodes constitute a serious health problem of domesticated small ruminants, especially sheep and goats which constitute an important source of animal protein to many Nigerians. A lot of socio-economic importance is attached to the ownership of these animals that in some cases may be the only realizable wealth of a rural household (Nwosu*etal*, 2007).

Gastrointestinal helminthes are major contributing factors to reduced productivity in sheep and goats. Parasitic infections range from acute disease frequently with high rates of mortality and chronic disease leading to various degree of morbidity and pre-mature culling to sub-clinical infections where the animals may be relatively healthy but perform below their potential (Gana*et al.*,2015).

Medium and large scale farmers interested in commercial small ruminant farming in Nigeria is managed either in intensive or semi intensive conditions. This system of rearing inherently incurs different diseases which in turn reduces profitability of farming by treatment costs, reducing productivity and by mortality (Fabiyi and Lawal, 2012).

Parasitic diseases, coupled with inadequate management hamper the productive husbandry of these animals. Gastrointestinal parasite infestations are worldwide problems for both small and large scale farmers but their impact is greater in sub -Saharan Africa due to the availability of a wide range of agro-ecological factors suitable for diversified host and parasite species (Fikru*et al,* 2006). Gastrointestinal parasites are known to be widespread in Nigeria and limit ruminant production in many parts of the country (Chiejina, 1995;Fabiyi and Lawal, 2012). The direct losses caused by these parasites are typified by hyper-acuteness and death, pre-mature slaughter, rejection of some parts at meat inspection while indirect losses include the reduction in productive potential such as decreased growth rate, weight loss, diarrhoea, anorexia, and sometimes anaemia. These constitute a major impediment to efficient and profitable livestock production (Nahed-Toral, 2003). The objectives of the study were to determine the prevalence rate of parasitic gastrointestinal nematodes in slaughtered small ruminants according to the species, age and sex of the animal.

MATERIALS AND METHODS

Study area:

A cross sectional study was conducted with the objectives of determining the prevalence of small ruminant major gastrointestinal nematodes from the faecal samples obtained at Jalingo metropolitan abattoir, Taraba state, north-east Nigeria from December 2014 to May 2015.The area lies between latitude 6^{o} 25′ and 9^{o} 30′norths and between longitude 9^{o} 30′ and 11^{o} 45′easts. It has estimated land areas of about 54,428km^2(square kilometers). The state is bordered to the west by Gombe and Plateau States, south-west by Benue State, north-east by Adamawa state. An international boundary on the east separates the state from the republic of Cameroon. The topography is largely made up of undulating plains and rising hills. It is transverse by many rivers. The major one being River Benue which rises from the highlands of the Cameroon and flows southwards to join the River Niger (Taraba ADP, 2004).

The climate is suitable for both animals and crop production. It is characterized by two distinct seasons: Dry and Wet. The wet season usually start from April to end in October while the dry season is from November to March. April is the hottest month of the year with a mean maximum temperature of about 28^{o}E. The average yearly rainfall is about 1,350mm, the mean monthly hour of sunshine is highest in December and lowest in August and the mean relative humidity is highest in August and lowest in February (Taraba ADP, 2004).

The study animals: A total of 914 small ruminants (569 Goats and 345 Sheep) of all sexes and ages were used in this study. The study animals were all local breeds, kept under traditional extensive management system and obtained from livestock markets across the state. Those animals with the age of less than one year were considered as young, while those greater than or equal to one year were considered as adults.

Study design: A cross-sectional study design was used to determine the prevalence of gastrointestinal nematodes of ruminants based on the laboratory analysis of faecal samples for the presence of nematode eggs. A random sampling technique was employed to select the study animals. Age, sex and species were considered for the occurrence of major gastrointestinal nematodes in small ruminants. The total sample size was calculated based on the predetermination of the following parameters: a 95% level of confidence, 5% desired level of precision and 50% expected prevalence according to Thrustfield (2005), since there was no similar study done in the area. Accordingly, 914 small ruminants were sampled.

Faecal Sample Collection and Examination Procedure: Collected faecal samples were put in sampling polythene bags and all the necessary information was labeled. The collected samples were transported to the parasitology laboratory, Taraba state College of Agriculture, Jalingo, where the samples were processed and analyzed immediately. In the laboratory, faecal samples were examined for the detection of nematode eggs using standard procedures of simple test tube floatation as described by Charles, (2006).

Data Management and Analyses: The collected data from field level (abattoir) and the laboratory investigation was coded appropriate variables and entered specific sets of questionnaire on the list sheet of the Epi-info version 7.2.0 statistical software packages. The prevalence was calculated by dividing the number of positive animals by the total number of animals examined and times 100. Percentage was used to measure prevalence and Chi Squared test was used to measure the association between the prevalence of the parasites and the age, sex and species of the animals. In all analyses, confidence level was held at 95% and $P<0.05$ was set for significance.

Faecal analysis: Faecal samples collected from abattoir was analyzed by the Simple test tube floatation egg counting technique using a saturated solution of sodium chloride(NaCl) as the floating medium for demonstrating and counting helminthes eggs in faecal samples. It is the most widely employed method for this purpose. Saturated salt solution has a higher specific gravity than the organism to be floated so that the organism rise to the top and the debris sink to the bottom (CDC, 2013).

RESULTS

A total of 914 faecal samples were analyzed using simple floatation technique, 390 or 42.7% of the samples revealed different types of nematodes eggs while 524 or 57.3% did not reveal nematodes eggs. Five hundred and sixty-nine (569) faecal samples were from goats while three hundred and forty-five (345) faecal samples were from the sheep. Out of the 569 samples analyzed in goats, 246 or 43.2% were positive with different types of nematodes eggs while 323 or 56.8% were negative. Out of the 345 faecal samples analyzed in sheep, 144 or 41.7% were positive with nematodes eggs while 201 or 58.3% were negative (Table 1).

These results indicate that prevalence of parasitic nematodes in small ruminants (sheep and goats) slaughtered at Jalingo abattoir, Taraba state was highest in goats with 43.2% and lesser in sheep with 41.7%.

Out of the 306 and 371 adult sheep and goats that were examined,136 (44.4%) and 175 (47.2%) were infected respectively. Out of 39 and 198 young sheep and goats that were examined, 8 (20.5%) and 71 (35.9%) were infected respectively (Table 2).

These results clearly indicatethat from the faecal samplesamong the sheep and goats that were examined, the adult animals were found to be more infected than the young.

Out of the 120 male sheep and 375 male goats examined, 44 (36.7%) and 164 (43.7%) were infected respectively. Out of the 225 female sheep and194 female goats that were examined, 100 (44.4%) and 82 (42.3%) were infected respectively (Table 3).

From these results it was clear that the male goats and female sheep were more infected than female goats and male sheep, however; there was no statistical significance (P>0.05) among male and female animals.

Table1: Prevalence of Parasitic Gastrointestinal Nematodes of small ruminants in Jalingo abattoir, Taraba state

Species	**Number Examined**	**Number Infected (%)**	**Chi Square**	**P-value**
Goats	569 (62.3)	246 (43.2)	0.196	0.66
Sheep	345 (37.7)	144 (41.7)		
All Animals	**914 (100.0)**	**390 (42.7)**		

Table 2: Sex specific prevalence of Parasitic Gastrointestinal Nematodes of small ruminants in Jalingo abattoir, Taraba state

	Number Examined	**Number Infected (%)**	**Chi-Square**	**P-value**
Goats				
Sex:				
Male	375	164(43.7)	1.863	0.172
Female	194	82(42.3)	0.201	0.654
Subtotal	**569**	**246(43.2)**		
Sheep				
Sex:				
Male	120	44(36.7)	1.863	0.172
Female	225	100(44.4)	0.201	0.654
Subtotal	**345**	**144(41.7)**		
Total	**914**	**390(42.7)**		

Table 3: Age specific prevalence of Parasitic Gastrointestinal Nematodes of small ruminants in Jalingo abattoir, Taraba state

	Number Examined	**Number Infected (%)**	**Chi-Square**	**P-value**
Goats				
Age:				
Adult	371	175(47.2)	0.504	0.479
Young	198	71(35.9)	3.453	0.043
Subtotal	**569**			
Sheep				
Age:				
Adult	306	136(44.4)	0.504	0.479
Young	39	8(20.5)	3.453	0.043
Subtotal	**345**			
Total	**914**	**390 (42.7)**		

DISCUSSION

This study on the prevalence of parasitic gastrointestinal nematodes of small ruminants slaughtered at Jalingo abattoir of Taraba state reveals the existence of major gastrointestinal parasites (strongyle-type) with an overall prevalence of 42.7% in both sheep and goats based on the counts of nematodes eggs in the faecal samples. The results indicated that goats were more infected with parasitic gastrointestinal nematodes than the sheep. The results of this study agrees with the results of similar studies byBiu*et al,* (2009), at the University of Maiduguri Research farm where goats recorded high prevalence rate(58.0%) of infection

than the sheep that had 54.0% infection rate, and Yaro*et al.* (2015) in Madagali Local Government Area of Adamawa state where they recorded 42.0%, 46.0% prevalence rates in male sheep and male's goats respectively. It was also observed that the prevalence rate was higher in goats (48.3%) than sheep that had 46.6%. In similar study by Koinari*et al.* (2012)in Australia, it was revealed that goats recorded higher prevalence rate (89%) of infection than the sheep that recorded 72% infection rate. Other findings that reported higher prevalence rates in goats than sheep include (Regassa, *et al,* 2006; Nwosu, *et al,* 2007; Gadahi*et al,* 2009; and Ntonifor, *et al,*2013). The reason that may be attributable for these findingsis that goats do not develop resistance as efficiently as sheep (Hoste*et al.,*2006). However, there was no statistical significance (P>0.05) between species of animals in this study.

The overall prevalent rate in this finding is lower than the results of previous findings in sheep and goats in different parts of Nigeria. Findings by Fakae, (1990) shows that a strongyle nematodes (*Haemonchus contortus*) was as high as 87.1% infection rate and Nwosu*et al,* (1996) that revealed a slightly high prevalence rate of 55.8% infection rate in goats than what was obtained in this study. This difference is expected due to the fact that the overall trend in helminthosis in ruminants is that of an escalating worm burden during the period of confinement (April to October), and low worm burden when animals are allowed free range (November to March), these periods correspond to the cropping and harvest season respectively (Fakae, 1990). Sissay*et al,* (2007), in Ethiopia also corroborated that the mean burden of adult nematodes is generally moderate in both sheep and goats, showing patterns of seasonal abundance that correspond with the bi-modal annual rainfall pattern, with the highest worm burden around the peak of rainy season.

It was clearly indicated in this study that faecal egg counts of gastrointestinal parasites was recorded high in the adult animals of both species. This finding agrees with the findings of (Nwosu*et al.,* 2007; and Ntonifor.,*et al,* 2013) which clearly shows that adult animals could have been harbouring matured worms from the previous infection during the summer which eventually results in shedding more eggs during the dry season as established by Sissay, *et al,*(2007). However, statistical significance in this study reveals that the young animals were shown to be more at risk to acquiring the infection than the older animals. This may be due to the fact that young animals are less immune than adult animals that are immuno-competent to withstanding the infection even though they are exposed to a high infection pressure from the L3-contaminated environment (Zajac, 2006).

In this study, it was also revealed that the faecal egg count (FEC) were generally moderate in both sheep and goats irrespective of sex of the animals. This result was in agreement with the findings of Nwosu *et al., (*2007) in a study conducted on the prevalence and seasonal changes in gastrointestinal nematodes of small ruminants in the semi-arid zone of north-east, Nigeriaand a study conducted by Sissay*et al,* (2007) on the epidemiology and seasonal dynamics of nematodes infections of sheep in the semi-arid region of eastern Ethiopia. This result contradicts the finding of the work by Gana*et al*., (2015) in Sokoto north-west Nigeria where it was established that sex variations among various species of small ruminants infected with *Haemonchus* species of nematodes existed.

During this study, it was noted that variations in the degree of prevalence of parasitic gastrointestinal nematodes infection among the species, sex and age of small ruminantsJalingo, Taraba state could be attributed to the system of management that the small ruminants are subjected to, which in most cases exposes the animals to the infective stage of the parasites, indiscriminate and abusive use of anthelmintic drugs and lack of basic information on the modern livestock farming. However, because of the cosmopolitan distribution of the parasites ((Fikru*et al.,*2006) and the economic importance of parasitic gastrointestinal nematodes in the small ruminants' industry, variations in gut parasites prevalence rates in different part of the world have been previously reported in Ethiopia (Sissay*et al,* 2007), Jordan (Maraqa*et al.,*2005), in Iraq (Kadir and Rashid, 2008), in Turkey (Kara*et al.,*2009) and in Egypt (Abouzeid*et al.,*2010). The climatic variations across different geographical regions and type of husbandry practices adopted are factors that can influence survival of the parasites. This may thus account for the observed variation in the prevalence rate of gut parasitism reported by different workers (Okorafor, *et al.,*2015).

Thus, the findings of this work show that, parasitic gastrointestinal nematodes are among the factors militating against small ruminants' industry.

CONCLUSION

It could be concluded from the findings that gastrointestinal nematodes are endemic in small ruminants within Jalingo and its environs. The findings should be of help to veterinarians and livestock workers in Jalingo Abattoir as they should certify that only healthy small ruminants examined are slaughtered. It will also help farmers in organizing animal husbandry system, maintenance of proper health, feeding, and sanitary conditions, deworming, towards maximum productivity.

RECOMMENDATIONS

Governments as a matter of priority resuscitates the moribund extension services for effective enlightenment in the area of livestock production and formulates programmes of strategic yearly and routine deworming of all ruminants. For better output, livestock farmers should be encouraged to deworm their sheep and goats three (3) or four (4) times every year.

REFERENCES

Abouzeid, N. Z., Selim, A. M. and El-Hady, K. M. (2010). Prevalence of gastrointestinal parasites infections in sheep in the Zoo garden and Sinai district and study the efficacy of anthelmintics drugs in the treatment of these parasites. *Journal of American Science*, 6: *544-551*.

Ademosun A.A. (1988). The development of the livestock industry in Nigerian Ruminants. Proceedings of the Nigerian Agricultural society, 10:13-20.

Akerejola, O. O. Schillhorn van Veen, T. W. and Njoku, C. O. (1979). Ovine and Caprine diseases in Nigeria: a review of economic losses. Bull. Anim. Hlth. Prod. Afr. 27: 65-70.

Biu, A.A., Maimunatu, A., Salamatu, A.F. and Agbadu, E.T. (2009).A faecal survey of gastrointestinal parasites of ruminants on the University of Maiduguri Research Farm.*International Journal of Biomedical and Health Sciences Vol. 5, No. 4.*

Carmichael, I. H. (1972).Helminthiasis in domestic and wild ruminants in Botswana preliminary investigations.*Trop. Anim. Hlth. Prod.4: 175-181.*

Charles, M. H. (2006). *Diagnostic Veterinary Parasitology*. 3rdedStalious Elsevier Science.

Center for Disease Control and Prevention (CDC). DDPX_Laboratory I dentification of Parasitic Disease of Public Health Concern. www.cdc.gov/parasite

Chiejina, S. N. (1995). The current status and priorities of research on the epidemiology and control of helminth infections of ruminants in West Africa, In: proceedings of the 6th symposium on tropical. *Animal Health and Production, Helminth Diseases of Ruminants: Diagnosis, Epidemiology andCcontrol, 10: 2-30.*

Fabiyi, J. P. and Lawal, A. O. A. (2012). Seasonal fluctuations of nematode infestations in goats in the savannah belt of Nigeria. Bull, Epizootic disease, 21: 277-286.

Fakae, B.B. (1990). The Epidemiology of Helminthosis in small ruminants under the traditional husbandry system in Eastern Nigeria. *Vet Res Commun 14(5): 381-91.*

Fikru, R., Teshule, S., Reta, D. and Yosef, K. (2006).Epidemiology of gastrointestinal parasite of ruminants in Western Oromia Ethiopia.*International Journal of Applied Research in Veterinary Medicine, 4: 51-57.*

Gadahi, J. A., Arshed, M.J., Ali, Q., Javaid, S.B. and Shal, S.I. (2009) Prevalence of gastrointestinal parasites of Sheep and Goats in and around Rawalpindi and Islamabad, Pakistan. *Veterinary world 2, 21-53.*

Gana, J. J., Makun, H., Chiezey, N. P. and Tekdek, L. B. (2015). Epidemiological study on abomasal nematodes of slaughtered small ruminants raised in guinea savanna zone of Nigeria. *Sokoto Journal of Veterinary Sciences* 13(2): 26-33

Hoste, H., F. Jackson, S. Anthanasiadou, S.M. Thamsborg, and S. Hoskin. (2006). The effect of tannins-rich plants on parasitic nematodes in ruminants. *Trends in Parasitology 22:253-261*

Kadir, M. A., and Rasheed, S. A. (2008). Prevalence of some parasitic helminths among slaughtered ruminants in Kirkuk slaughter house, Kirkuk, Iraq. *Iraqi Journal of Veterinary Science, 22: 81- 85.*

Koinari, M., Kari, S., Ryan, U. and Lymberi A.J. (2012) Infection levels of gastrointestinal parasites in sheep and goats in Papua, New Guinea. *Journal of Helminthology. 87 (4):1-7*

Lawal-Adebowale, O.A. (2012).Dynamics of Ruminant Livestock Management in the context of Nigerian Agricultural System. Agricultural and Biological Sciences ISBN 978-953-51-0814 l

Madu, P.P., C.O. Nwosu, and W.S. Richards. (2005). Small Ruminants Production in small holder's farms in semi-arid zone of North-Eastern Nigeria. Proceedings of Nigerian Society for Animal Production 30:258-262.

Maraqa, A., Amr, Z., Rifai, L. and Al-Melhim, W. (2005).An Abattoir Survey of Liver and Lung.Helminthic Infections in Local and Imported Sheep in Jordan.*Turkish Journal of Veterinary Animal Science, 29: 1-2.*

Nahed-Toral, J., Lopez-Tirado, Q., Mendoza-Martinz, G., Aluja-Schunemann, A., and Trigo- Tavera, F.J. (2003). Epidemiology of parasitosis in the Tzotzil sheep production system.*Small Ruminant Research, 49 (2):199-206. [7]*

Ntonifor, H.N., Shei S.J., Ndale N.W. and Mbunkur G.N. (2013) Epidemiological studies of parasitic infections in ruminants in Jakiri, Bui Division, North-West Region of Cameroon. *Journals of Veterinary Medicine and Animal Health.*Vol. 5(12). Pp. 344-352.

Nwosu, C.O., A.F. Ogunrinade, and B.O. Fagbemi (1996). Prevalence and seasonal changes in gastrointestinal helminthes of Nigerian goats. *Journal of Helminthology, 70: 329-33.*

Nwosu, C.O., P.P. Madu, and W.S. Richards. (2007). Prevalence and seasonal changes in the population of parasitic gastrointestinal nematodes of small ruminants in thesemi-arid zone of north-eastern Nigeria.*Veterinary Parasitology, 144: 118-124.*

Okorafor, U. P., Obebe, O. O., Unigwe, C. R., Atoyebi, T. J. and Ogunlaye, O. K. (2015). Studies on the gut parasites of small ruminants reared in some selected farms in Ido Local government area of Oyo state Nigeria. *Applied research journal, vol. 1, issue 3 pp 153-159*

Sissay, M.M., A. Ugla, P.J. Waller. (2007). Prevalence and seasonal incidence of nematodes parasites and fluke's infections of sheep and goats in eastern Ethiopia.Trop. Animal Health Production. 39(7): 521-31.

Taraba Agricultural Development Projects (2004). First Quarterly Report (January – March).

Thrusfield, M., (2005). *Veterinary epidemiology*,3 ed. Black well and science ltd. London, pp: 233.

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 gastrointestinal parasites of small ruminants in Madagali Local Government Area, adamawa state Nigeria. *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) 5ver.1, Pp 86-89.*

Zajac, A.M. (2006). Gastrointestinal nematodes of small ruminants: life cycle, anthelmintics, and diagnosis.*Food Anim Pract. 22(3):529-41.*