FUDMA Journal of Sciences (FJS)
ISSN online: 2616-1370
ISSN print: 2645 - 2944
Vol. 9 No. 1, January, 2025, pp 288 - 291
DOI: https://doi.org/10.33003/fjs-2025-0901-3061

PREVALENCE OF FASCIOLOSIS AND DICROCOELIOSIS IN SLAUGHTERED SHEEP AND GOATS IN BAUCHI ABATTOIR, BAUCHI STATE, NORTHEAST NIGERIA

***[1]Chongmobmi, M., [1]Gamawa, A. A., [1]Usman, Y. and [2]Nuhu, Y.**

[1]Department of Animal Health Technology, Bauchi State College of Agriculture, Bauchi PMB 0088
[2]Department of Animal Production Technology, Bauchi State College of Agriculture, Bauchi PMB 0088

*Corresponding authors' email: chongmarkus@gmail.com Phone: +2347033189099

ABSTRACT

Sheep and goats are a major contributor of protein in the Nigerian livestock industry. Their productivity is greatly hampered by helminths which account for enormous economic losses. In view of this, 420 bile samples were randomly collected from slaughtered sheep (134) and goats (286) in the Bauchi abattoir between the months of January to May 2024. The bile samples were analysed in the laboratory for the presence of fasciola and dicrocoelium parasites. The age, sex and species of the animals were determined using standard procedures. Out of the 420 sheep and goats sampled 90 (21.4%) were positive for fasciolosis and dicrocoeliosis. The infection was highest with *Dicrocoelium dendriticum* (84.5%) and was least with *Fasciola spp* (2.2%). There was significant association between infection and species of animals examined (P = 0.047) with higher infection rate seen in sheep than goats. However, age and sex of the sheep and goats sampled did not significantly influence disposition to infection with the parasites (P = 0.682 and 0.551 respectively). Based on overall prevalence (21.4%) obtained in this study it can be concluded that, fasciolosis and dicrocoeliosis are moderately endemic with dicrocoeliosis beng more prevalent than fasciolosis in the study area among slaughtered sheep and goats examined. The infection is more common in sheep than goats in the study area. Therefore, it is recommended that routine and strategic deworming should be intensified particularly for sheep and goats in the Bauchi area.

Keywords: Fasciolosis, Dicrocoeliosis, Sheep, Goats, Abattoir, Bauchi

INTRODUCTION

Sheep and goats are important part of livestock and are reared in different parts of the world due to their excellent ability to adapt and tolerate different climatic conditions (Skapetas and Kalitzidou 2017). In Nigeria, keeping of sheep and goats is popular among peasants and Fulani herders. They serve a great deal of importance socially and economically as they contribute in terms of meat, milk, skin, manure and festivities (Olupinyo and Ajanusi 2005). Owing to the current economic trend, the cost of cattle production in Nigeria is increasingly high. This in turn put more demand on sheep and goats thereby making their meats become the readily available and affordable both in the urban and rural centres.

The livestock sector is hampered by diseases that are commonly aggravated by poor management and inadequate nutrition, particularly parasitic diseases caused by helminths. These parasitic infections have negative consequence on productivity such as delayed growth rate, decreased live weight gain, reduced reproductive performance and condemnation of meat (Taylor *et al.*, 2016). The common helminths causing production problems in sheep and goats is liver flukes.

The liver flukes are recognised as one of the most important ruminants helminthic parasites found in different parts of the world (Massoud *et al.*, 2012), the commonly occurring liver flukes in Nigeria are the *Fasciola spp* and *Dicrocoelium spp*. They cause major disease of livestock that produce important economic losses due to mortality, liver condemnation, reduced production of meat, milk and wool (Kleiman *et al.*, 2007). Dicrocoeliosis as a disease of grazing animals appears to be less severe than Fasciolosis but may cause considerable liver damage (Ahmadi *et al.*, 2010). Reports on the occurrence of *Fasciola* and *Dicrocoelium* parasites in cattle exists for many parts of Nigeria but there is paucity of information on their occurrence in sheep and goat. Even the few existing ones are almost a decade ago. Hence, this study was conducted to determine the prevalence of fasciolosis and dicrocoeliosis among slaughtered sheep and goats in Bauchi abattoir with a view to cover the informational dearth.

MATERIALS AND METHODS

Description of the study area

The study was conducted at the Bauchi Metropolitan Abattoir located in Bauchi, the Bauchi State capital. The town occupies a total land mass of 3,687 km2 and is located between latitude 10.3°N and longitude 9.8°E. It has an elevation of 616 m above sea level. The town has a population of 493,810 people as per the 2006 National Census figures (NPC 2006). The area falls within the Sudan savannah vegetation zone and is rocky due to its location on the northern edge of the Jos Plateau. The area experiences two marked seasons, a rainy and a dry season. Rainfall starts around April or May and last through October with peak precipitation in August while the dry season last from November to April. Relative humidity level is low (49.3%) during the dry season and high (88.6%) during rainy season with peak periods between July and September. The area is drained by three major streams namely Barkindo stream, Shadawanka stream, and Rafin Tambari. Majority of the people are subsistence farmers and the commonly domesticated animals are goats and sheep.

Determination of physical characteristics of the animals examined

A total of 420 small ruminants (134 sheep and 286 goats) were sampled during the study between January and May 2024. During each sampling occasion, detail records about the sex, age, and species of the animals were determined. The sex of the animals examined was assessed by the presence of mammary glands in the females and testicles in the males, while ages were estimated by observing the rostral dentition using eruption of the frontal teeth as an index in line with the method of Getty *et al.* (1975).

Sample collection
Bile samples were randomly collected from the gall bladder of slaughtered sheep and goats by excising the gall bladder and transferring the bile into a white plastic bag. The samples were labelled, transferred into a cooler and were transported to the laboratory for analysis.

Bile analysis and ova identification
The bile samples were analysed using the modified bile concentration technique described by Thienpont *et al.,* (1979) and were viewed under microscope at ×40 magnification. The ova and adults seen were identified on the basis of morphological characteristics as described by Urquhart *et al.,* (1996).

Data analysis
Data obtained with respect to prevalence of parasites among different sex, age, and species of animals sampled were analyzed by the Chi-square test at 95% confidence level using SPSS computer software version 21.

RESULTS AND DISCUSSION
Out of the 420 sheep and goats examined 90 (21.4%) were positive for fasciolosis and dicrocoeliosis. Majority of the infected animals suffered from dicrocoeliosis (84.5%) than fasciolosis (2.2%) and the cases of co-infection were occurring at 13.3%. All these are depicted in Table 1.

Table 1: Distribution of trematode species encountered among sheep and goats slaughtered at the Bauchi abattoir

Trematode spp	No. Positive (n=420)	Prevalence (%)
Dicrocoelium dendriticum	76	84.5
Fasciola spp	2	2.2
Co-infection	12	13.3
Total	90	21.4

The result for the prevalence of fasciolosis and dicrocoeliosis in relation to the species of animals examined is shown in Table 2. Sheep appeared to harbour more infection than goats and the difference observed was highly significant ($p < 0.05$).

Table 2: Prevalence of fasciolosis and dicrocoeliosis based on species of animals examined

Species	No. exam	No. positive	Prevalence (%)	X^2	p-value
Ovine (shee)	134	39	29.1	4.592	0.047
Caprine (goats)	286	51	17.8		
Total	420	90	21.4		

Table 3 shows the prevalence of fasciolosis and dicrocoeliosis based on age of sheep and goats sampled. The infection appeared to be similar among various ages of sheep and goats examined ($p > 0.05$).

Table 3: Prevalence of fasciolosis and dicrocoeliosis in relation to age of sheep and goats sampled

Age	No. exam	No. positive	Prevalence (%)	X^2	p-value
Adult	380	80	21.1	0.167	0.682
Young	40	10	25.0		
Total	420	90	21.4		

Fasciolosis and dicrocoeliosis in relation to sex of sheep and goats examined revealed slightly higher prevalence in females than males. However, this difference was not statistically significant ($p > 0.05$). All this is presented in Table 4.

Table 4: Sex-wise distribution of fasciolosis and dicrocoeliosis among slaughtered sheep and goats

Sex	No. exam	No. positive	Prevalence (%)	X^2	p-value
Male	98	18	18.4	0.356	0.551
Female	322	72	22.4		
Total	420	90	21.4		

Discussion
The overall prevalence (21.4%) of fasciolosis and dicrocoeliosis among slaughtered sheep and goats at the Bauchi abattoir is noteworthy and is consistent with the report of Olupinyo and Ajanusi (2005) who reported similar prevalence 21.0% among sheep and goats in Zaria, Northwest Nigeria. Conversely, it is lower than the 39.1% in sheep and 35.0% in goats reported by Isah (2019) elsewhere in Northern Nigeria. The finding of this study is higher than the 7.7% and 5.4% (sheep and goats respectively) reported by Khanjari *et al.* (2014) from Northern Iran and also higher than the 10.4% prevalence among sheep and goats obtained by Oljira *et al.* (2022) in Central Ethiopia. Moderately high prevalence reported indicate the endemicity of infection with the parasites among sheep and goats in the study area. The marked variation in the prevalence obtained in this work and other previous reports may not be unconnected to differences in favourable environmental condition that supports the development of the intermediate host. More so, this present work was done during the dry season period while most of the other reports covered the entire seasons of the year.
Majority of the infected sheep and goats examined harboured higher infection rates with *Dicrocoelium dendriticum* (84.5%) than with *Fasciola spp* (2.2%). However, a higher infection rate with *Fasciola spp* than with *Dicrocoelium spp* among sheep and goats was reported by Khanjari *et al.* (2014) in Northern Iran. They attributed their findings to the influence of season where moisture facilitate the distribution and survivability of the intermediate host particularly in the rainy season. During the dry season periods, shallow waters which are the snail habitats tends to dry up and this account for the low infection rates encountered with *Fasciola* parasites

(chongmobmi and Panda 2018). Additionally, movement of animals during the dry season for grazing is intense and this increase the chances of contacting ants which serve as the intermediate host of *Dicrocoelium* parasite.

The result for the higher prevalence of fasciolosis and dicrocoeliosis in sheep than goats is an interesting one. This finding corroborates with the reports of Oryan *et al.* (2011) in Iran, Bayu *et al.* (2013) in Ethiopia and Alstedt *et al.* (2022) in Germany, they equally reported higher prevalence of trematodes infection in sheep than goats. However, this is not consonance with the work of Ahmed *et al.* (2005) who reported higher prevalence of trematodes in livers of goats than sheep in Quetta, Pakistan and they do not give any elucidative reason to their finding. The higher prevalence in sheep than goats obtained in this work may be attributed to the grazing habits of the two species. Sheep are grazers while goats are popular for their browsing habits and do not graze around marshy areas (Abdulhakim and Addis 2012). Owing to the above, it is not surprising that sheep had higher infection rate than goats since their grazing habits easily expose them to the infection agents. The differences could also be due to immunological response seen among the two species where sheep appeared to acquire low resistance to liver flukes (Phiri *et al.*, 2006). Sheep are generally more susceptible to acute forms of disease than goats and majority of the sheep brought to the abattoir are managed under semi intensive system. This makes them prone to the infection.

The similar infection rates among adult and young animals examined in this work is in line with the report of Dey *et al.* (2021) from Bangledash. However, higher infection rate in young than adult sheep and goats was reported by Oljira *et al.* (2022) from Ethiopia and they attributed their finding to naivety of the young animals and tendency of decreasing infection rate with the advancement of age. The similar infection rate obtained in this study is not surprising as cursory observation revealed both young and adult of sheep and goats in the study area move together for grazing and within the same climate.

The result of the present study revealed male and female animals sampled had equal disposition to infection with the parasites. This finding is consistent with the report of Birhanu *et al.*, (2015) from Addis Ababa and Dey *et al.*, (2021) from Bangledash but is in contrast with the report of Oljira *et al.*, (2022) who reported higher prevalence in females than males. They attributed the difference to disposition in the number of examined females than males slaughtered during the study period. The equal disposition to infection in relation to sex of animals sampled may not be unconnected to the management system adopted by herders and animal owners in the study area. Both male and female animals are seen moving together grazing and this might be the reason for the equal infection rates encountered among them. Mandonnet *et al.* (2005) on the other hand reported that pregnancy and lactation imposes stress in the female animals thereby making them less resistant to infection with the parasites.

CONCLUSION

The result of this study clearly indicated dicrocoeliosis to be more prevalent than fasciolosis in the study area among slaughtered sheep and goats examined. The 21.4% overall prevalence obtained opine to moderate endemicity to infection with the parasites. The infection is seen more commonly in sheep than goats in the study area. Therefore, it is recommended that routine and strategic deworming should be intensified particularly for sheep and goats in the Bauchi area. Environmental modification that will reduce breeding space for the intermediate hosts should be greatly encouraged. Further studies into the economic importance of these parasites among sheep and goats in the study area should be undertaken.

REFERENCES

Abdulhakim, Y., Addis, M., (2012). An abattoir study on the prevalence of fasciolosis in cattle, sheep and goats in Debre Zeit Town, Ethiopia. Glob. Vet. 8 (3), 308–314.

Ahmadi R., Sikejor, E. M., Maleki M. D. (2010). Prevalence of dendriticum infection in cattle, sheep and goat in Gilan province, Northern Iran. J Anim Vet Adv. 9(21): 2723-2724.

Ahmed, S., Nawaz, M., Gul, R., Zakir, M., Razzaq, A., (2005). Diversity and Prevalence of Trematodes in Livers of Sheep and Goats in Quetta, Pakistan. *Pakistan J. Zool*. 37(3): 205-210.

Alstedt, U., Voigt, K., Jager, M. C., Knubben-Schweizer, G., Zablotski, Y., Strube, C., Wenzel, C. (2022). Rumen and Liver Fluke Infections in Sheep and Goats in Northern and Southern Germany. *Animals*. 12, 876. https://doi.org/10.3390/ani12070876.

Bayu, Y., Asmelash, A., Zerom, K., Ayalew, T., (2013). Prevalence and Economic Importance of Liver Parasites: Hydatid Cyst, *Fasciola* species, and Cysticercus tenuicolis in Sheep and Goats Slaughtered at Addis Ababa Abattoir Enterprise in Ethiopia. *J. Vet. Med. Anim. Health.* 5 (1), 1–7. https://doi.org/10.5897/JVMAH11.029

Birhanu, A., Tesfaye, R., Derso, S., (2015). Prevalence and associated risk factors of *Fasciola* infection in small ruminants slaughtered at Addis Ababa abattoir Enterprise, Ethiopia with reference to diagnostic value of its coprological examination. *Afr. J. Basic Appl. Sci.* 7 (4), 181–186. https://doi.org/10.5829/idosi. ajbas.2015.7.4.94248.

Chongmobmi, M. and Panda, S. M., (2018). Bovine gastrointestinal trematodosis in Nigeria: A Review. *ISOR Journal of Agriculture and Veterinary Science*. 11(11): 8-19.

Dey, A. R., Begum, N., Biswas, H., Alam, M. Z. (2021). Prevalence a d factors influencing gastrointestinal parasitic infections in sheep in Bangladesh. *Ann. Parasitol*. 67(2):187-194. https://doi.org/10.17420/ap6702.328 .

Getty, R., Sisson, S., Grossman, J. D., (1975). The anatomy of domestic animals. 5th edition, W.B. Saunders, Philadelphia, PA, 378 p.

Isah, U. M., (2019). Studies on the Prevalence of Fascioliasis among Ruminant Animals in Northern Bauchi state, North-Eastern Nigeria. *Paras. Epidemiol. Control*. 5, e00090. https://doi.org/10.1016/j.parepi.2019.e00090.

Khanjari, A., Bahonar, A., Fallah, S., Bagheri, M., Alizadeh, A., Fallah, M., Khanjari, Z., (2014). Prevalence of fasciolosis and dicrocoeliosis in slaughtered sheep and goats in Amol Abattoir, Mazandaran, northern Iran. *Asian Pac. J. Trop. Dis*. 4 (2), 120–124. https://doi.org/10.1016/S2222-1808(14)60327-3.

Kleiman, F., Pietrokovsky, S., Prepelitchi, L., Carbajo, A. E., Wisnivesky-Colli, C. (2007). Dynamics of Fasciola hepatica Transmission in the Andean Patagonian valleys, Argentina. *Vet Parasitol*. 145(3): 274-286.

Mandonnet, N., Bachand, M., Mahieu, M., Arquet, R., Baudron, F., Abinne-Molza, L., Varo, H., Aumont, G. (200)5. Impact on productivity of peri-parturient rise in fecal egg counts in Creole goats in the humid tropics. *Veterinary Parasitology* 134: 249-259.

Massoud, A. M., Shalaby, H. A., El Khateeb, R. M., Mahmoud, M. S., Kutkat, M. A. (2012). Effects of Mirazid and myrrh volatile oil on adult Fasciola gigantica under laboratory conditions. *Asian Pac J Trop Biomed*. 2(11); 875-884.

National Population Commission (NPC) (2006). Nigeria National Census: Population Distribution by Sex, State, LGAs and Senatorial District: 2006 Census Priority Tables (Vol. 3).

Oljira, W., Mideksa, B., Mekonnen, G., Kebebew, G., Jorga, E. (2022). Fasciolosis in sheep and goats slaughtered at abattoirs in Central Ethiopia and associated financial losses. *Food Waterborne Parasitol*. 3;28:e00173. https://doi.org/10.1016/j.fawpar.2022.e00173. PMID: 35958883; PMCID: PMC9361309.

Olupinyo, KC and Ajanusi JO. (2005) prevalence of fasciola species and Dicrocoelium species in sheep and goats slaughtered at Zaria abattoir. Nigerian Veterinary Journal. 26(2): 73-75.

Oryan, A., Mansourian, M., Moazeni, M., Nikahval, B., Barband, S. (2011). Liver distomatosis in cattle, sheep and goats of northeastern Iran. *Global Vet*. 6(3): 241-246.

Phiri, I. K., Phiri, A. M., Harrison, L. J., (2006). Serum Antibody isotype Response of Fasciola-infected Sheep and Cattle to Excretory and Secretary Products of *Fasciola species*. *Vet. Parasitol*. 141, 234–242. https://doi.org/10.1016/j.vetpar.2006.05.019.

Skapetas, B., Kalaitzidou M. (2017). Current status and perspectives of sheep sector in the world. *Livestock Research for Rural Development* 29. http://www.lrrd.org/lrrd29/2/skap29021.html

Taylor, M. (2012). Emerging parasitic diseases of sheep. *Vet Parasitol*; 189(1): 2-7.

Thienpont, D., Rochette, F., and Vanparijs, O. F. J. (1979). Diagnosing helminthiasis through coprological examination. Janssen Research Foundation, Beeres Belgium. 112.

Urquhart, G. M., Amous, J., Duncan, J. L., Dunn, A. M., Jennings, F. W. (1996). Veterinary parasitology. 2nd edition, Black Well Science Ltd, London, UK, 307 p.