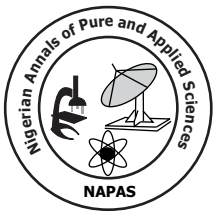

Abbatoir Survey of Intestinal Parasites among Sheep in Katsina State, Nigeria

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Abstract

Faecal samples collected from seven hundred sheep brought for slaughter in some abattoirs in six Local Government Areas of Katsina State were examined for presence of intestinal parasites. The samples were examined for eggs of parasites using direct smear and formol-ether concentration technique. The overall prevalence was 236(33.7%). The cestode identified was *Moniezia* sp. 16(2.3%). The coccidian oocyts had a prevalence of 8.6%. The nematodes identified were *Strongyle* sp. 116(16.6%) and *Trichuris* sp. 17(2.4%), while the only trematode identified was *Fasciola* sp. 17(2.4%). Factors such as sex, age and breed of the sheep were found not to significantly influence the prevalence of infection ($P>0.05$). The results of the study showed that season was a factor which can significantly influenced the prevalence of infection among sheep in the study area ($P<0.05$). The study identified high prevalence of intestinal parasites among sheep slaughtered in the six abattoirs. Therefore, strategic control approach by using effective broad spectrum chemotherapeutics especially at the beginning of rainy season to reduce the burden of infection is recommended.

Key words: Sheep, Cestodes, Coccidian oocyts, Nematodes, Trematodes.

Introduction

Nigeria has an estimated 22.1 million sheep of various breeds found predominantly in the northern region due to the favourable microclimatic conditions (Bourn *et al*., 2018). In Nigeria, sheep are not only kept for meat and skin but also for religious and social ceremonies as well as a source of income (Lawal-Adebowale, 2012; Adua *et al*., 2017).

Gastro intestinal parasites which include various helminthes and protozoan parasites are world-wide problem to some animals in tropical and subtropical countries but their impact is greater in Sub-Saharan Africa due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and parasite species (Regassa *et al*., 2006; Murthy and Rao, 2014; Karaye *et al*., 2018). These parasites causes considerable global economic losses as a consequence of reduced weight gain, digestive disturbance, lowered production, impaired reproductive performance, condemnation of affected organs, and mortality of infected animals (Raza *et al*., 2007).

In sheep, the wool quality and yield is reduced due to deficiency in essential amino acids which is required for the growth of the wool and grease fleece (Murthy and Rao, 2014). Although several studies have been carried out with respect to diversity and prevalence of gastrointestinal parasites in animals in different parts of Nigeria (Jatau *et al*., 2011; Jegede *et al*., 2015; Paul *et al*., 2016; Karaye *et al*., 2018). To the best of our knowledge, only one study has been carried out in Katsina State on sheep. Okaiyeto *et al*. (2008) in their survey of gastrointestinal parasites of nomadic sheep in eight Local Government Areas of Northern Nigeria, were able to survey only one Local Government Area within Katsina State. This present study is necessary to give a proper and more detail understanding of the diversity, prevalence, distribution and risk factors associated with infection within the state for rational design of effective preventive and control measures against the infections.

Materials and Methods

Study Area

The study was carried out in six Local Governments Areas within Katsina State. Katsina State covers an area of 24,192 sq km and is located between latitudes 12°15´N; 12°50´N and longitudes 7°30´E; 7°58´E. The state is bounded to the north by Niger Republic, to the east by Jigawa and Kano States, to the west by Zamfara State and to the south by Kaduna State. Water supply is sourced through the damming of rivers, reservoirs and digging of wells and boreholes because most of the rivers, streams, lakes and reservoirs dry out during the dry season. The state has a varying climate with a cool dry season (harmattan) from October to February, hot dry season from March to May and a warm wet season from June to September.

Study design

Two Local Government Areas were selected from each of the three vegetation zones giving a total of six Local Governments. 700 faecal samples were collected and examined for presence of intestinal parasites. The study was carried out from November 2017 to October 2018 to cover both the dry and rainy seasons.

Table 1: List of Vegetation Zones and Local Government Abattoirs sampled

Vegetation Zone s	Characteristics of each Vegetation Zone	Local Government Areas Sampled	Coordinates of Sampled Local Government Area
Zone A	Southern part of t he state; vegetation similar to that of the Northern Guinea Savanna ; mean annual rainfall about 1000mm	Funtua	11° 32 " N; 7°19 " E and 11.33°N; 7.317°E
		Kafur	11°39´N, 7°42´E and 11.650°N; 7.700° E
Zone B	Centre of the state; vegetation similar to that of Sudan Savanna; mean annual rainfall about 500mm.	Kankara	11°55´N; 7°24´E and 52.10" N; 40.14" E
		Dutsin-Ma	12°27´18" N; 7°29´29 "E and 12.45500°N; 7.49139°E

Zone C	northern part of the state; vegetation similar to that of Sahel Savanna; mean annual rainfall that is less than 300mm	Baure	12°47´N; 8°46´E and 12.783°N; 8.767°E
		Maiadua	13°11´26" N; 8°12´42 " E and 13.19056°N; 8.21167°E

Ethical consideration

Permission was obtained from the Director, Veterinary Services under the Ministry of Agriculture and Natural Resources, Katsina State as well as the managers of the abattoirs before faecal samples were collected.

Faecal sample collection

The samples were collected directly from the rectum of the animals immediately after they were slaughtered using disposable hand gloves and transferred into sterile, labelled, wide mouthed specimen bottles with screw caps, preserved in 10% formalin solution and taken to the Parasitology Laboratory, Department of Zoology, Ahmadu Bello University, Zaria for microscopic examination.

Collection of Data

A structured questionnaire was used to obtain information on sex which was by examination of the genitalia. The age of the sheep was determined by using the guide of FAO (1994) While the breed of the sampled sheep was determined using the guide of Lawal-Adebowale, (2012).

Faecal Sample processing

The modified Formol-Ether concentration technique was be used to concentrate eggs and cysts of the gastrointestinal parasites (Cheesbrough, 2009). Briefly, 1 g 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 respectively. Parasite identification was done using the keys of (Kaufmann, 1996; Foreyt, 2001).

Data 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 (χ^2). *P*-value of <0.05 was considered as statistically significant. All data analysis was done using the Statistical Package for Social Sciences (SPSS) Version 21.0.

RESULTS

The results of the study revealed that 236(33.7%) of the 700 sheep examined were infected with intestinal parasites. The cestode identified was *Moniezia* sp. 16(2.3%). The coccidian oocyts had a prevalence of 8.6%. The nematodes identified were *Strongyle* sp. 116(16.6%) and *Trichuris* sp. 17(2.4%), while the only trematode identified was *Fasciola* sp. 17(2.4%). (Table 2). Findings from this study also showed that Prevalence of infection was higher in Funtua and Kafur Local Government Areas which represented zone A compared to other Local Government Areas in zones B and C respectively (P>0.05). Male sheep had more prevalence (38.5%) than the female (31.3%) (Table 4).

Table 2: Frequency of intestinal parasites among 700 sheep examined

Parasite species	Number infected	Prevalence (%)
Moniezia sp.	16	2.3
Coccidian oocyts	70	8.6
Strongyle sp.	116	16.6
Trichuris sp.	17	2.4
Fasciola sp.	17	2.4
Total	236	33.7

Table: 3 Prevalence of gastrointestinal infection in relation to Local Government Areas sampled

Local Govt. Area sampled	Number Examined	Number Infected	Prevalence (%)
Funtua	126	46	36.5
Kafur	114	43	37.7
Kankara	105	33	31.4
Dutsin-Ma	119	37	31.1
Baure	115	38	33.0
Maidua	121	39	32.2
Total	700	236	33.7

Table 4: Prevalence of intestinal parasites in relation to sex

Sex	Number Examined	Number infected	Prevalence (%)
Male	231	89	38.5
Female	469	147	31.3
Total	700	236	33.7

Sheep between the ages of 4 years and above had the highest prevalence (37.3%) compared to the 2-3 years (32.3%) as well as the 0-1 year (31.1%) (P>0.05) (Table 5).

Prevalence in relation to the breed of the sheep showed that the Yankassa breed was more infected (36.3%) compared to the Balami (32.8%) and Uda (31.3%) (P>0.05) (Table 6). The findings of this study also showed that season is a factor which significantly influenced the prevalence of infection (P<0.05) (Table 7).

Table 5: Prevalence of intestinal parasites in relation to age

Age	Number Examined	Number infected	Prevalence (%)
0-1	151	47	31.1
2-3	313	101	32.3
4 and above	236	88	37.3
Total	700	236	33.7

Table 6: Prevalence of intestinal parasites in relation to breed

Breed	Number Examined	Number infected	Prevalence (%)
Balami	189	62	32.8
Uda	233	73	31.3
Yankassa	278	101	36.3
Total	700	236	33.7

Table 7: Prevalence of intestinal parasites in relation to season

Season	Number Examined	Number infected	Prevalence (%)
Wet	350	161	46.0
Dry	350	75	21.4
Total	700	236	33.7

Discussion

The results of this study showed a prevalence of 33.7% which is higher than the 10. 2% previously reported by Karaye *et al*. (2018). The prevalence observed prevalence is lower than those obtained by Dawet *et al*. (2014), Abdullahi *et al*. (2015) and Ngele *et al*. (2018). This difference in prevalence may be attributed to the high moisture content and temperature in these locations which favour the growth and development of larvae on pasture resulting to increased interactions between the host and parasites

The higher prevalence obtained among female sheep concurs with the findings of Dawet *et al*. (2014). However, Abdullahi *et al*. (2015) and Jegede *et al*. (2015) reported a higher prevalence among the male sheep. However, the difference obtained was not statistically significant.

The highest prevalence obtained among the 4 years and above age group is in agreement with the findings of Anene *et al*. (1994) and Jegede *et al*. (2015) This high prevalence is not surprising because Previous studies in Nigeria by Nwoke *et al*. (2015); Ola-Fadunsin and Ibitoye (2017) and Mandado *et al*. (2016) in Ethiopia have shown that adult sheep were more prone to parasitic diseases than the young one due to the roaming nature of the adults This however contradicts the reports of previous researchers such as Sangma *et al*. (2012), Raza *et al*. (2014) and Islam *et al*. (2017) who reported a higher prevalence among sheep below the age of four.

The findings of this study revealed that the Yankassa breed of cattle were more infected compared to the Balami and Uda which had the least prevalence of infection. This however disagree with the findings of Jegede *et al*. (2015) who reported the highest prevalence among the Uda breed compared to the Yankassa and Balami breeds. The non-significant difference obtained among the different breeds of sheep might be attributed to their exposure to equal sources of infection such as pasture and water.

The results of the study also revealed a significant difference between infection and season of the study. The higher prevalence of infection during wet season is in agreement with the findings of Ola-Fadunsin and Ibitoye (2017) and might be due to high moisture content and moderate temperature which is seen during the wet seasons that favour the growth and development of gastrointestinal parasites and their vectors or infective stages.

Conclusion

The finding of this study shows that gastrointestinal infection is widespread among sheep slaughtered in some abattoirs within Katsina State. The high infection rates recorded during the wet season is as a result of favourable conditions for the growth and development of the parasites and their infective stages. This may have a negative implication on the productivity of the sheep as well as the risk of zoonotic transmission. Therefore, improving farm management system and routine deworming of these sheep is recommended.

References

Abdullahi, A.Y., Bringa, A.M. and Gwarzo, Y.S. (2015). A Survey of gastrointestinal helminth parasites of slaughtered sheep around Kano Metropolis. *Journal of Biology and Genetic Research,* 1(8): 9-16.

Adua, M.M. and Hassan, D.I. (2016). Prevalence of nematode infestation in goats reared in Nasarawa State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*, 12(3):79-84

Anene, B.M., Onyekwodiri, E.O., Chime, A.B. and Anika, S.M. (1994). Gastrointestinal parasites of sheep and goats of Southeastern Nigeria. *Small Ruminant Research*, 13:187–192.

Bourn, D., Wint, W., Blench, R. and Woolley, E. (2018). *Nigerian Livestock Resources Survey*. Animal Genetic Resources (AnGR) project in Nigeria. Retrieved on 14th May, 2020 from http://angr.org.ng/2018/03/28/nigerian-livestock-resources-survey/

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

Dawet, A., Yakubu, D. P. and Haledu, U. I. (2014).Gastrointestinal helminths of selected ruminants in Jos, Plateau State, Nigeria. *African Journal of Natural Sciences* 7:29 – 36.

Food and Agriculture Organization (FAO). (1994). A manual for the primary health care worker. Retrieved on 23rd January, 2017 from www.fao.org/t0690e00.htm#contents.

Foreyt, J.W. (2001): *Veterinary Parasitology: Reference Manual*. Blackwell Publishers. Iowa. Pp: 69-72.

Islam, M.S., Hossain, M.S., Dey, A.R., Alim, M.A., Akter, S. and Alam, M.Z. (2017). Epidemiology of gastrointestinal parasites of small ruminants in Mymensingh, Bangladesh. *Journal of Advanced Veterinary and Animal Research*, 4(4):356-362.

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*, 9(1):7-11.

Jegede, O.C., Adejoh, A.A., Obeta, S.S. and Olayemi, O.D. (2015). Gastrointestinal parasites of sheep and goats in Gwagwalada Area Council, Federal Capital Territory, Abuja, Nigeria; with a special reference to sex, breed and age. *Alexandria Journal of Veterinary Sciences*, 46:170-176.

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.

Kaufmann, Johannes: (1996). *Parasitic infections of domestic animals: a diagnostic manual*. *Springer, Basel*. Pp146-152.

Lawal-Adebowale, O.A. (2012). Dynamics of ruminant livestock management in the context of the Nigerian Agricultural System. In: *Livestock Production*. InTech. USA. Pp 61-63. http://dx.doi.org/10.5772/52923

Mandado T., Argaw, S. and Garedew, L. (2016). The Prevalence of mange infestations in small ruminants in three agro-ecological zones of Wolaita zone, southern Ethiopia. *Advances in Life Science and Technology*, 42(1): 18-24.

Murthy, G.S.S. and Rao, P.V. (2014). Prevalence of gastro intestinal parasites in ruminants and poultry in Telangana region of Andhra Pradesh. *Journal of Parasitic Disease*, 38(2):190–192.

Nwoke, E.U., Odikamnoro, O.O., Ibiam, G.A., Umah, O.V. and Ariom, O.T. (2015). A survey of common gut helminth of goats slaughtered at Ankpa abattoir, Kogi state, Nigeria. *Journal of Parasitology and Vector Biology*, 7(5): 89-93.

Ngele, K. K., Ebi, S. and Anuonye, B. C. (2018).Prevalence of intestinal helminthes in ruminants slaughtered at Abakaliki abattoir, Ebonyi State, Nigeria. *Journal of Animal Science and Veterinary Medicine*, 3:58-64.

Okaiyeto, S.O., Tekdek, L.B., Sackey, A.K.B. and Ajanusi, O.J. (2008). A survey of gastrointestinal parasites of nomadic sheep in eight Local Government Area of Northern Nigeria. *Research Journal of Animal Sciences*, 2($): 92-94.

Ola-Fadunsin,S.D. and Ibitoye, E.B. (2017). A retrospective evaluation of parasitic conditions and their associated risk factors in sheep and goats in Osun state, Nigeria. *Sokoto Journal of Veterinary Sciences,* 15(3): 20 – 29.

Paul, B.T., Biu, A.A., Gadzama, M.A., Ali, M., Mana, H.P. and Jairus, Y. (2016). Point prevalence and intensity of gastrointestinal parasite ova/oocyst and its association with Body Condition Score (BCS) of sheep and goats in Maiduguri, Nigeria. *Journal of Advances in Parasitology*, 3(3): 81-88.

Raza, A.M., Iqbal, Z., Jabbar, A. and Yaseen, M. (2007). Point prevalence of gastrointestinal helminthiasis in ruminants in Southern Punjab, Pakistan. *Journal of. Helminthology*, 81: 323-328.

Raza, M.A., Younas, M. and Schlecht, E. (2014). Prevalence of gastrointestinal helminths in pastoral sheep and goat flocks in the Cholistan desert of Pakistan. *The Journal of Animal & Plant Sciences*, 24:127–134.

Regassa, F., Sori, T., Dhuguma, R. and Kiros, Y. (2006). Epidemiology of gastrointestinal parasites of ruminants in Western Oromia, Ethiopia. *International Journal of Applied Research in Veterinary Medicine*, 4(1):51-57.

Sangma, A., Begum, N., Roy, B.C. and Gani, M.O. (2012). Prevalence of helminth parasites in sheep (*Ovis aries*) in Tangail district, Bangladesh. *Journal of the Bangladesh Agricultural University*, 10: 235–244.