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Full Length Research

Prevalence of intestinal helminthes in ruminants slaughtered at Abakaliki abattoir, Ebonyi State, Nigeria

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ABSTRACT: Helminthes parasites are one of the major causes of economic loss in ruminants all over the world, leading to decrease in number of ruminants mainly in developing countries. This study was aimed at identifying parasitic helminthes and its prevalence among ruminants slaughtered at Abakiliki abattoir. Fecal samples were collected using a screw capped universal container and examined using flotation techniques. Two hundred ruminants comprising 75 cattle, 75 sheep and 50 goats were examined for different species of helminthes parasites. The Cattle and sheep had prevalence of 89.3% each while goats had a prevalence of 72.0%. Single infections had a prevalence of 71.5% while multiple infections had a prevalence of 13.5%. Platyhelminthes and nematodes were recovered from the study, with nematode infection being more prevalent than the platyhelminthes. *Bunostomum* spp. had the highest prevalence of 34.7% among the nematode parasites recovered while *Strongyloides* spp. had the least prevalence of 1.0%. *Taenia* spp. and *Fasciola* spp. were the only platyhelminthes parasites recovered with prevalence of 17.0% and 6.5% respectively. In conclusion, the results show that there is high prevalence of helminthes infections among ruminants slaughtered at Abakaliki abattoir. Hence, there is need for constant inspection of animals during and after slaughtering by health officers before consumption.

Key words: Abattoir, cow, helminthes, goats, parasites, ruminants, sheep.

INTRODUCTION

Ruminants provide numerous socio-economic benefits to households, providing proteins and income (Mathew and Omeke, 2007). However, consistent helminthosis attack resulting in high morbidity rate has remained a major challenge to ruminants' production (Boes et al., 2000; Perry et al., 2002). Helminthes parasitic infections are the major causes of economic loss in ruminants all over the world (Stear et al., 1997; Vercruysse and Dorny, 1999). They include nematodes (roundworms), cestodes (tapeworms), and trematodes (flukes) that affect the growth as well as the production of the animals. Helminthes parasites are abundant in both temperate and tropical countries, where climatic and many other environmental factors provide near-perfect conditions for their survival and development (Perry et al., 2002). In Nigeria they are prevalent in most geographical zones where there are poor sanitation and low standard of living causing enormous economic losses due to the associated morbidity and mortality (Schmidt and Roberts, 1997; Perry et al., 2002, Chiejina and Ikeme, 2007).

Helminthes are also of considerable significance in a wide range of agro-climatic zones and represent one of the most important constraints to ruminant production. The direct losses caused by these parasites include acute illness and death. Others are premature slaughter and rejection of some parts during meat inspection. The indirect losses decrease the productive potential, decreased growth rate, weight loss in young growing animals and late maturity of slaughter stock (Hansen and Perry, 1994).

Infection usually occurs mainly through contaminated feed and water, enhanced by poor hygiene (Gatongi, 1996). Intestinal helminthosis has for many years been recognized as a major problem in rearing ruminants (Barger, 1997). Most ruminants infected have been shown to be asymptomatic or produce only mild symptoms, as a

result of which infections are often ignored till serious complications or chronic clinical signs occur (Rausch and Jentoft, 2002).

The severity of infections depend on the genera of helminthes parasites involved, animal species, the number of infective stages on pasture, a change in host susceptibility, the introduction of susceptible host into an infected environment, the introduction of infections into an environment, ineffective parasite removal from the host animals due to poor drug administration practices, the immune system of the animal and local environmental conditions such as humidity, temperature, rainfall, vegetation and management practices (Hansen and Perry, 1994; Sykes, 1994; Urquhart et al., 1996).

Several studies carried out on parasitic helminthes affecting ruminants in many African countries showed that the prevalence of the infections varies from place to place (Gillian et al., 2004; Agumah et al., 2015). Therefore, this study is aimed at investigating helminthes species that infect ruminants slaughtered at Abakaliki abbatoir, Ebonyi State, Nigeria.

MATERIALS AND METHOD

Study area

Abakiliki is the capital of Ebonyi State and the largest town in the state. Its geographical coordinates are approximately between 6°20'0" North latitude and 8° 6' 0" East longitude, and 117 meters elevation above sea level. Abakiliki's climate is classified as tropical climate. Two main seasons exist in Abakiliki, the dry season which spans from November to March and the rainy season which begins in April and ends in October with a short period of reduced rain in August commonly referred to as "August break". Temperature in the dry season ranges from 20 to 38^{0}C, and results in high evapotranspiration, while during the rainy season temperature ranges from 16 to 28^{0}C, with generally lower evapotranspiration. Average annual rainfall varies from 1,500 to 1,650 mm (Ezeh and Anike, 2009). The population of Abakaliki is about 149,683 inhabitants (NPC, 2006). The inhabitants are mainly civil servants, traders and peasant farmers. The abattoir used for this study is located approximately at the center of the town and is the major abattoir in the town. The major ruminants slaughtered in Abakiliki abattoir are cattle and sheep, with goats being slaughtered sparingly and occasionally. Some of them were reared in the area, while some were transported from the North-eastern parts of the country mainly Borno, Yobe and Adamawa States as well as neighboring countries such as Niger, Chad and Cameroon.

Faecal sample collection

Faecal samples were collected directly from the rectum of the slaughtered animals randomly using sterile disposable plastic gloves and placed in a clean transparent wide mouth, screw capped universal bottle. For each animal, the date of sampling, animal identification number and sex were recorded. The samples were transported on the same day of each sample collection in an airtight box cooler with dry ice packs to the Biology Laboratory of the Federal University Ndufu Alike Ikwo for parasitological analysis.

Examination of faecal samples

Three grams of each faecal sample were mixed with 45 mL of floatation fluid, sodium chloride (1.2 specific gravity) to recover the intestinal eggs from the faecal debris. The presence of parasite stages (eggs or larvae of helminthes) were identified as described by Foreyt (2001), Cheesbrough (2002) and Arora and Arora (2005) using 10× and 40× magnifications.

Statistical analysis

The overall prevalence was calculated as shown in the equation below. Relative prevalence for different species of parasites was calculated and stratified by sex compared using Chi-square test. In all analyses, P value of <0.05 was set as the level of significance. The analysis was performed using SPSS software for Windows version 22.0 (SPSS Inc., Chicago, USA).

$$\% \text{ Prevalence} = \frac{\text{Number of organisms of host species infected}}{\text{Number of organisms examined}} x \frac{100}{1}$$

RESULTS

The prevalence of parasitic helminthes in ruminants was 85.0% (n=170). Cattle and sheep had a prevalence of 89.3% each, while goats had a prevalence of 72.0% (Table 1). There was a significant difference (P = 0.012) in the overall prevalence of helminthes infection from the different ruminants examined, using the Chi square test. Single helminthes infections had a prevalence of 71.5% (n=143), while multiple helminthes infection had a prevalence of 13.5% (n=27) (Table 2). There was a significant difference (P= 0.002) in the single and multiple helminthes infections within the infected ruminants sampled.

Two Platyhelminthes organisms were recovered from the ruminants slaughtered at Abakaliki abattoir. They are *Taenia* species and *Fasciola* species. *Taenia* spp. had a higher prevalence 17.0% than *Fasciola* spp. 6.5%. Cattle were the most infected with both *Taenia* spp. and *Facsiola* spp. while goats were the least infected with both *Taenia* spp. and *Fasciola* spp. as seen in Table 2. There is no significance difference (p = 0.237, 0264) in both sheep and goats respectively.

Table 1. Prevalence of parasitic helminthes in ruminants slaughtered at Abakiliki Abattoir showing level of infection.

Ruminants	Number examined	Overall helminthes Infection n(%)	Single helminthes Infection n(%)	Multiple helminthes Infection n(%)
Cattle	75	67 (89.3)	50 (66.7)	17 (22.7)
Sheep	75	67 (89.3)	61 (81.3)	6 (8.0)
Goat	50	36 (72.0)	32 (64.0)	4 (8.0)
TOTAL	200	170 (85.0)	143 (71.5)	27 (13.5)
P. value		0.012*	0.002*	0.002*

*****significant difference at p<0.05, **ns -** not significantly difference.

Table 2. Plathyhelminthes parasites recovered from ruminants slaughtered at Abakiliki abattoir.

Ruminants	Number examined	Plathyhelminthes	
		***Taenia* spp. n (%)**	***Fasciola* spp. n (%)**
Cattle	75	17 (22.7)	7 (9.3)
Sheep	75	11 (14.7)	5 (6.7)
Goats	50	6 (12.0)	1 (2.0)
Total	200	34 (17.0)	13 (6.5)
P. value		0.237^{ns}	0.264^{ns}

*significant difference (p<0.05), **ns-** not significantly difference**.**

Table 3. Different species of nematode parasites recovered from ruminants slaughtered at Abakaliki abattoir.

Ruminants	Number Examined	Nematodes							
		***Bunostomum* Spp. n (%)**	***Ascaris* Spp. n (%)**	***Trichostrongylus* Spp. n (%)**	***Oesophagostum* Spp. n (%)**	***Haemonchus* Spp. n (%)**	***Strongyloides* Spp. n (%)**	***Toxocara* Spp. n (%)**	***Strongyle* Spp. n (%)**
Cattle	75	26 (34.7)	13(17.3)	0 (0.0)	0(0.0)	7 (9.3)	1 (1.3)	6 (8.0)	3(4.0)
Sheep	75	11 (14.7)	4 (5.3)	7 (9.3)	7(9.3)	24 (32.0)	1 (1.3)	0 (0.0)	4(5.3)
Goat	50	6 (12.0)	6 (12.0)	4 (8.0)	6(12.0)	6 (12.0)	0 (0.0)	0 (0.0)	5(10.0)
Total	200	43 (21.5)	23(11.5)	11 (5.5)	13 (6.5)	37 (18.5)	2 (1.0)	6 (3.0)	12 (6.0)
P. value		0.002*	0.070^{ns}	0.029*	0.013*	0.001*	0.714 ^{ns}	0.006*	0.366^{ns}

*****significant difference, **ns-** not significantly difference.

Eight different species of nematode parasites were recovered from the ruminants slaughtered at Abakaliki abattoir as shown in Table 3. *Bunostomum* species had the highest prevalence (21.5%) while *Strongyloides* species had the least prevalence (1.0%).

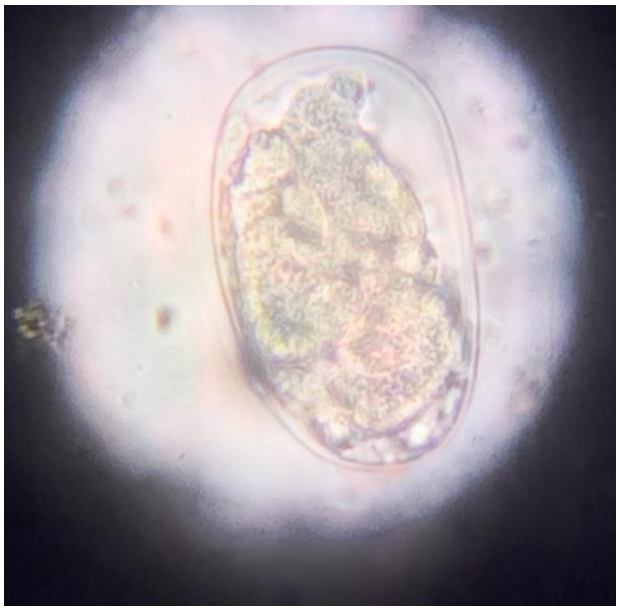

Plate 1. Diagram of *Bunostomum* egg as seen under 40x magnification.

Plate 2. *Ascaris lumbricoides* egg as seen under x40 magnification.

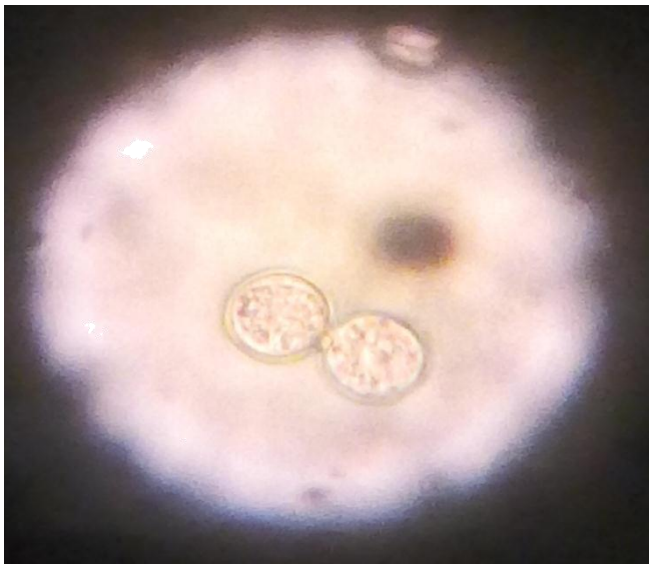

Plate 3. Double *Taeniae* infection as seen under x40 magnification.

DISCUSSION

This study was aimed at investigating the prevalence of parasitic helminthes infecting ruminants slaughtered at Abakiliki abattoir. The study showed that 170 (85%) ruminants were infected with different parasitic helminthes out of 200 ruminants examined. The high prevalence could be as a result of the period of study (rainy season). The high moisture content and temperature favours the growth and development of larvae on pasture resulting to increased interactions between the host and parasites. This finding is in agreement with Wadhwa et al. (2011), Ohaeri (2012), Usman et al. (2016), Yahaya and Tyav (2014), who recorded high prevalence of parasitic helminthes infection among ruminants slaughtered during rainy season in Bikanner Rajasthan, India; Umuahia, Abia State, Nigeria; Bauchi state, Nigeria and Wudil, Kano State, Nigeria respectively.

Single helminthes infections of the ruminants with a prevalence of (71.5%) is in agreement with the findings of Agumah et al. (2015), Adedipe et al. (2014), Usman et al. (2016), Ardo and Bitrus (2015). In addition, multiple infections had a prevalence of 13.5%. Mixed infection was characterized by the presence of two or more helminthes. The phenomenon of mixed infection has been suggested to be an important cause of morbidity and reduced production in livestock (Kumsa, 2011). Furthermore, the immune suppression of the host immune system by mixed infections increases host susceptibility to other diseases or parasites (Wang et al., 2006). Multiple helminthes infections were in agreement with the findings of Adedipe et al. (2014) and Josiah (2014). This could be as a result of the poor hygiene practices in Abakiliki abattoir.

From the study, ten species of helminthes parasites were recovered from the ruminants slaughtered in Abakiliki abattoir. The parasites encountered during the study include *Haemoncus* spp*, Strongyloides* spp, *Ascaris* spp*, Taenia* spp, *Bunostomum* spp, *Toxocara vitulorum, Stronglye* spp*, Oesophagostomu* spp, *Fasciola* spp. and *Trichostrongylus* spp (Plates 1 to 9). Generally, nematode infections were higher. This is in agreement with the findings of Adedipe et al. (2014).

Bunostomum, *Ascaris*, *Taenia* and *Fasciola* species had the following prevalence rates in Cattle, 34.7, 17.3, 22.7 and 9.3% respectively. These findings are similar to the

Plate 4. *Fasciola* spp. as seen under x40 magnification.

Plate 5. *Trichostrongylus* egg as seen under x40 magnification.

findings of Agumah et al. (2015), who reported a higher prevalence of *Fasciola* in cattle in Abakiliki. *Trichostrongylus* and *Haemonchus* were found highest in sheep with a prevalence of 9.3 and 32.0% respectively, while *Stronglye* spp and *oesophagostomum* were highest in goats with a prevalence of 10 and12% respectively. This is in accordance with the findings of Josiah (2014), who worked on gastrointestinal helminthes of small nematodes in Zaria, Nigeria.

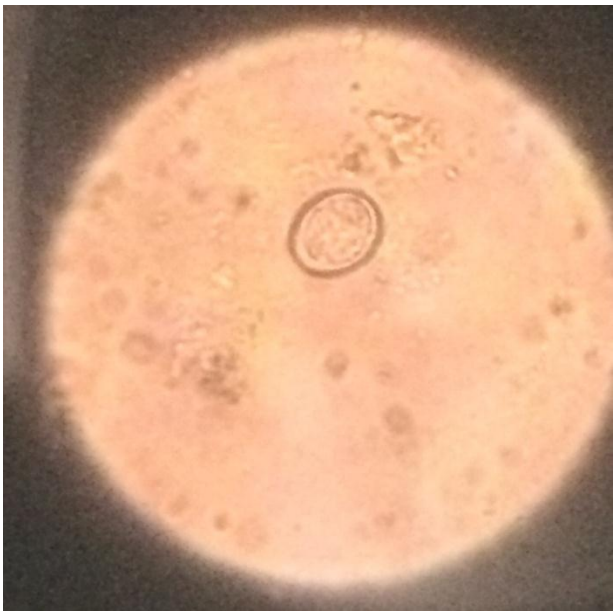

Plate 6. *Toxocara vitulorum* as seen under x40 magnification.

Plate 7. *Strongyle* type egg as seen under x40 magnification.

Cattle and sheep had the highest parasitic helminthes infection (89.3%) each while goats had the least helminthes infection (72.0%). This is in disagreement with the findings of Usman et al. (2016) and Agbajelola et al. (2015), who recorded a higher prevalence in sheep, than

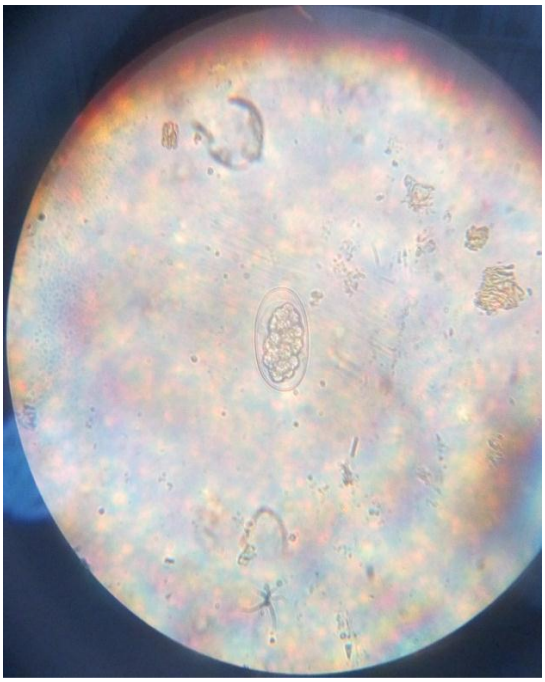

Plate 8. *Oesophagostomum* as seen under x40 magnification.

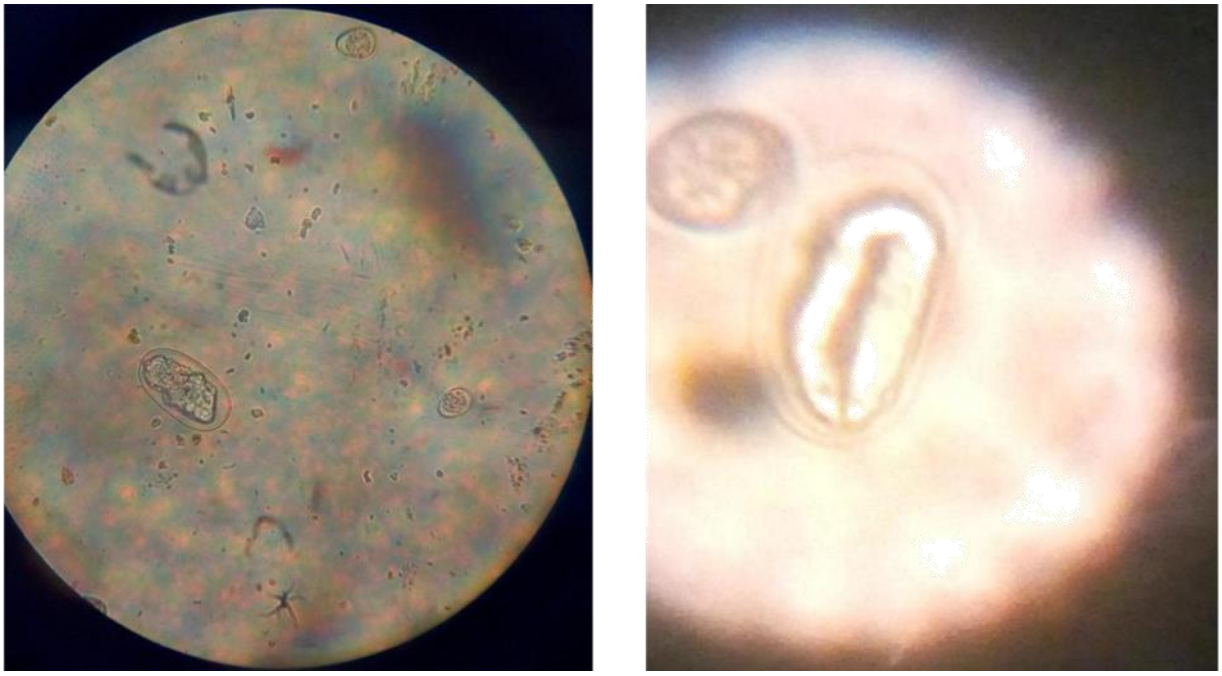

Plate 9. Diagram showing a multiple infection of helminthes parasites as seen under the microscope.

in cattle and also in agreement with Ngele and Ibe, (2014), who worked on the prevalence of *Fasciola* species among ruminants slaughtered at Eke market abattoir, Afikpo, Ebonyi State, Nigeria.

Conclusion

High prevalence of helminthes was found to infect ruminants in the study area. This has a negative impact on

both animal production and public health. Therefore, to mitigate these problems, appropriate anthelminthic regimen and control measures (comprehensive parasite control program, pasture management, and environmental sanitation) in ruminants and public health awareness should be encouraged.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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