



Prevalence of Intestinal Parasites Among Ruminant Animals in Dukpa Community Gwagwalada FCT-Abuja



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ABSTRACT

An epidemiological study was conducted from May-December, 2024 on the prevalence of intestinal parasites among ruminant animals in Dukpa Community Gwagwalada FCT-Abuja. A total of 600 ruminant animals comprising of 130 cattle, 256 goats and 214 sheep were examined using flotation technique to identify the parasitic ova. The overall prevalence rate of 62% was observed, cattle had the highest prevalence rate of 69.2% followed by goats 63.3% and then sheep with 56.1%. The difference in prevalence rate between different species of the animals were not statistically significant $p > 0.05$. Fulani cattle breed had the highest prevalence rate of 71.43%, followed by Wad Sheep and West African Dwarf goat with 66.18% and 65.57% respectively. The difference in prevalence rate between the different breed of goat and sheep animals was statistically significant $p < 0.05$ but between the species of cattle were not significant. The prevalence rate was higher in female goat 69%, cattle 69% and male sheep 59% whereas their counterparts had 48%, 67% and 59% respectively. Both young and adult of all breed were infected. The difference in prevalence rate between the sex and age of sheep and cattle were statistically insignificant but were significant between the sexes and age of goat. Nine parasites species were identified *Ascaris lumbricoides* 34%, *Ancylostom spp* 19%, *Trichostrongylus spp* 17%, *Strongyloides stecoralis* 11%, *Trichuris globulosa* 10%, *Haemonchus contortus* 5%, *Entoribius vermicularis* 2%, *Fasciola hepatica* 1% and *Eimeria faurei* 1%. The intestinal parasites are endemic in this study area and major species encountered have the zoonotic potentials that can threaten human and other animal's health. Educating farmers on the benefit of regular deworming is recommended.

Keywords:

Prevalence,
Ruminant Animals,
Intestinal Parasite,
Gwagwalada

INTRODUCTION

Livestock farming and trading are sources of income in rural communities across Nigeria, especially among subsistence farmers and pastoralists, contributing approximately 1.7% of the national gross domestic product (GDP) and approximately 9% of the agricultural value added (FAO, 2019). Over the years, parasitic infections have remained a major challenge to productivity in livestock farming in Nigeria, with helminth infections accounting for up to 79.92% of infections (Karshima *et al.*, 2018; Ola-Fadunsin *et al.*, 2020). The prevalence rate with these helminthes depends on the rearing methods, geographical area, and animal breed.

The intensive system of rearing which is usually safer and more productive but capital intensive is uncommon in this geographical location due to the economic condition and possibly tradition

Gastrointestinal helminths are ubiquitous parasitic agents of livestock, especially ruminants and are known to limit cattle production in many countries of the world (Rajput *et al.*, 2006; Hesterberg *et al.*, 2007). Mortality of animals due to parasitic diseases may not be alarming at times but their indirect effects on livestock productivity and their zoonotic impact on human health are considerably greater (Nwosu *et al.*, 2007; Ekong *et al.*, 2012). Indirect losses associated with helminth infections include the reduction in productive potentials such as decreased growth rate,

weight loss, diarrhoea, anorexia and sometimes anaemia (Rajput *et al.*, 2006).

There are numerous species of parasites affecting the health and wellbeing of livestock of which nematodes are the most prevalent documented in most previous studies (Luka *et al.*, 2018; Usman *et al.*, 2023; Ajakaye and Adejuyigbe 2024). Nematode or roundworms as popularly called are the most numerous multicellular animals that are none segmented and cylindrical in shape found throughout the world either as free-living organism or as parasite to other higher organisms (plants and Animals). There are about 20,000 described species of nematode ranging from microscopic to large species that can be seen with naked eyes. Generally, helminths are known to be a major constraint to ruminant's well-being and productive performance (Rajput *et al.*, 2006; Hesterberg *et al.*, 2007)

Despite advances made in animal management practices, most of these parasites continue to cause huge production losses in form of unthriftiness, emaciation and even death especially in naïve animals. Previous studies from Maiduguri (Nwosu *et al.*, 2007; Biu *et al.*, 2009) on gastrointestinal parasitism have been skewed towards determination of parasites in faeces, with few or no report on those harboured in the bile. The present study was designed

The animal's rears in this area are mainly for consumption and despite advances made in animal management practices, most of these parasites continue to cause huge production losses in form of unthriftiness, emaciation and even death especially in naïve animals. Also, most of these parasites have the zoonotic potential that cause a lot of issue to human health. This research aimed to provide recent data on prevalence, parasite's species and other associated risk factors in this study area which will help the livestock farmers and other stakeholders in design a proper control measures as well as improving their welfare and consumers health condition

MATERIALS AND METHODS

Study Area

Dukpa community in Gwagwalada Area Council (Figure 1), Federal Capital Territory (FCT), Abuja. Gwagwalada is located along Abuja-Lokoja road, about 55km South-west of the Abuja City Centre. It is delimited by Latitudes 8° 55' N and 9° 77' N and Longitude 7° 04' E and 12° 07' E. The FCT is underlain by basement complex which comprises predominantly high grade metamorphic and igneous rocks of the Precambrian age Obaje (2009). The community experiences a tropical wet and dry climate typical of the **northern Guinea Savannah** zone. The area is characterized by consistently hot conditions year-round, distinct wet and dry seasons, and rising temperatures. In this community, small-scale animal

husbandry is common, with households typically raising pigs, goats, cows, sheep and fowl (poultry) for both food and income.

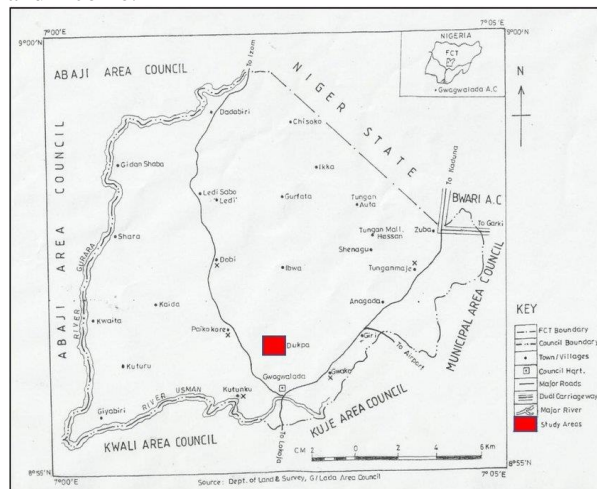


Figure 1: Map of Gwagwalada Area Council showing Dukpa Community

Sampling Method

Random sampling method was used to select the study animals, and fecal samples were collected from each selected animal in Dukpa Community Gwagwalada FCT-Abuja between May-December, 2024. The sample collected were transferred in a ice-cooled container to Biology Lab, Faculty of Science, University of Abuja for parasitological analysis.

Sample Size Determination

The sample size ($n = 384$) was determined based on the total number of ruminant animals in the study area is unknown, the population size is going to be labeled unknown, the confidence interval was taken as 5% and a confidence level of 95% was used with a standard deviation of 0.5. The sample size was determined using the Andrew Fisher's formula recommended by Getachew *et al.* (2017) a constant z-score value of 1.96, for 95% confidence level will be used.

$$N = \frac{Z^2 \times P_{exp}(1 - P_{exp})}{d^2}$$

$$N = \frac{1.96^2 \times P_{exp}(1 - P_{exp})}{d^2}$$

Where:

- **n** = required sample size
- **Z** = standard normal deviation (1.96 for 95% CI)
- **P** = expected prevalence (0.5 when unknown)

• d = desired precision (0.05)

$$\text{Sample size} = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2}$$

Sample size 384

During the study a total of 600 samples were collected, comprising 130 cattle, 256 goats, and 214 sheep, from 5 months to 5 years were selected via simple random sampling.

Sampling Collection

In total 600 fresh fecal samples were collected from the rectum of each selected animal and placed into a well-labeled (sex, breed and age), sterile zip-lock bag on ice packs maintained at 4°C and transported to the Biology Laboratory, Department of Biology, Faculty of Sciences, University of Abuja for parasitological analysis.

Laboratory Analysis

Preparation of Flotation Solution

400g of sodium chloride was dissolved in 500mL boiling water until super-saturation was achieved. The solution was allowed to cool-down and filtered as described by Krishi (2015).

Fecal Analysis

The faecal samples were collected directly from the rectum of each selected animal using spatula which was thoroughly washed and wiped after each collection to avoid cross contamination. Each sample was put into a clean and labeled sampling bottled indicating sex, age, breed and date of sample collection. Flotation techniques as described by Soulsby (1982). However, to avoid loss of floated materials, a clean glass slide was placed on the test tube and left for 25-30 minutes. The slide was then removed and cover slip was placed on the area containing the eggs/cysts. Slides were examined with the light microscope using x40 magnification and identification of the eggs was done their morphological structures as described by Bliss and Kvasnicka (1997).

Data Analysis

All data were subjected to Chi-square to determine the association between the prevalence of gastrointestinal

parasites and the variable (risk factors) and descriptive statistics. $P < 0.05$ was used to determine the level of significance. All analysis was done using Microsoft excel version 10.0

RESULTS AND DISCUSSION

Out of 600 animals examined, exactly 372 were infected with at least one gastrointestinal parasite giving an overall prevalence of 62.0%. The difference in prevalence rate between species of the animals were statistically not significant $p > 0.05$ (Table 1). Breed wise Fulani cattle breed had the highest prevalence rate of 71.43%, followed by Wad Sheep and West African Dwarf goat with 66.18% and 65.57% respectively. The difference in prevalence rate between the different breed of goat and sheep animals were statistically significant $p < 0.05$ but between the species of cattle were not significant table 2. The prevalence rate was higher in female goat 69%, cattle 69% and male sheep 59% whereas their counterparts had 48%, 67% and 59% respectively table 3. Both young and adult of all breed were infected. The difference in prevalence rate between the sex and age of sheep and cattle were statistically insignificant but were significant between the sexes and age of goat table 4. Nine parasites species were identified *Ascaris lumbricoides* 34%, *Ancylostom spp* 19%, *Trichostrongylus spp* 17%, *Strongyloides stecoralis* 11%, *Trichuris globulosa* 10%, *Haemonchus contortus* 5%, *Entoribus vermicularis* 2%, *Fasciola hepatica* 1% and *Eimeria faurei* 1% table 5.

Animal	No. examined	No. infected	Percentage %	Chi-square Value	P-value
Cattle	130	90	69.2	5.991	1.79
Goat	256	162	63.3		
Sheep	214	120	56.1		
Total	600	372	62		

Table 1: Prevalence of Gastrointestinal parasites based on Different Species of Ruminants in Dukpa community, Abuja

Table 2. Prevalence of intestinal parasites infection in Different Breed of Ruminants Animal in the Study Area

Species	Breed	No. Examined	No. Infected	Percentage (%)	Chi-Square Value	P – Values
Goat	Dwarf Goat	209	139	65.5	3.841	14.84
	Sahelian	47	17	42.5		
	Sub-Total	256	97	59.88		
Sheep	Wad Sheep	153	101	66	3.841	21.52
	Balami Sheep	61	19	31.1		
	Sub-Total	214	120	56.1		
Cattle	Sokoto Gudali	18	11	61.1	3.841	0.39
	Red Bororo	20	13	65		
	White Fulani	92	66	71.43		
	Sub-Total	130	90	69.2		
Grand Total		384	239	62.24		

Table3. Prevalence of Gastrointestinal parasites of Ruminants based on Sex in Dukpa community, Abuja

Species	Sex	No. Examined	No. Infected	Percentage (%)	Chi-square Value	P – Value
Goat	Male	73	35	48	3.841	10.34
	Female	183	127	69		
Sheep	Male	29	17	59	3.841	0.09

	Female	185	103	56		
Cattle	Male	12	8	67	3.841	0.04
	Female	118	82	69		
Total		600	372	62		

Table 4: Prevalence of Gastrointestinal Parasites of Ruminants based on Animal's Age in Dukpa community, Abuja

Species	Age	No. Examined	No. Infected	Percentage (%)	Chi-Square Value	P-Value
Goat	Young	82	44	54	3.841	4.81
	Adult	174	118	68		
Sheep	Young	71	37	52	3.841	0.68
	Adult	143	83	58		
Cattle	Young	28	19	68	3.841	0.03
	Adult	102	71	70		
Total		600	372	62		

Table 5: Species diversity of Gastrointestinal Parasites of Ruminants in Dukpa community, Abuja

Parasite Species	No. of Sample Encountered	Prevalence (%)
<i>Ascaris lumbricoides</i>	126	34
<i>Ancylostomidaespp</i>	70	19
<i>Trichosrongyluspp</i>	62	17
<i>Strongyloidesstecoralis</i>	42	11
<i>Trichuris globulosa</i>	37	10
<i>Haemonchuscontortus</i>	20	5
<i>Enterobius vermicularis</i>	8	2

<i>Fasciola hepatica</i>	4	1
<i>Eimeria faurei</i>	3	1
Total	372	100

The overall prevalence of (62%) was observed in the present study which showed high transmission of gastrointestinal helminths among ruminant animals in the area, with potential impacts on livestock productivity and human health. The high prevalence is in consistent with previous studies within the country (Usman, *et al.*, 2016; Usman, *et al.*, 2023; Ajakaye and Adejuyigbe 2024). The high prevalence recorded could be attributed to the time of study (rainy season). The high moisture content and temperature favors the growth and development of larvae on pasture, resulting in increased contact between the host and parasites. This finding is in agreement with Yahaya and Tyav (2014) who recorded high incidence of parasitic infection among animals slaughtered during rainy season in Wudil, Kano State, Nigeria. The prevalence rate was higher in cattle 69.2% followed by goats 63.3% and then sheep with 56.1%. The difference in prevalence rate between different species of the animals were statistically significant $p > 0.05$. These agreed with the report of Yuguda *et al.* (2018) on cattle slaughtered cattle in Bauchi central abattoir. The high prevalence in the cattle and sheep is possible due to the grazing habit where cattle and sheep graze closer to the ground festering opportunity of exposure of the parasite (Asif *et al.*, 2008). Although, there are all pasture in the same environment but goat get less care compare to cattle and sheep due to their economic values

Breed wise Fulani cattle breed had the highest prevalence rate of 71.43%, followed by Wad Sheep and West African Dwarf goat with 66.18% and 65.57% respectively. The

difference in prevalence rate between the different breed of goat and sheep animals were statistically significant $p < 0.05$ but between the species of cattle were not significant. This finding agreed with the finding of Usman, *et al.* (2023) on ruminant animals slaughtered in Biu central abattoir. Some species are more expensive than the other and due to that special care is given usually to the more expensive species.

The study reveals high prevalence in male goat 72.31%, sheep 41.7% and cattle 67.4% than in female counterpart with 51.6%, 77.4% and 65.2% respectively. These agreed with Yahaya and Tyav (2014) who reported 24.8% in male than 10.1% in female in Bovine (cattle) slaughtered in Wudil abattoir Kano State but is contrary to many previous studies that reported higher prevalence in female than male Odikamnor, *et al.* (2015); Usman, *et al.* (2016). The reason is male cattle, goat and sheep usually

has more care than their female counterpart because there are more expensive and has more traditional/religion value. In addition, the general understanding of helminthic infections was female animals are more susceptible to helminthiasis than male due to some physiological peculiarities of the female animals, which usually constitute stress factors that reduce their immunity to infections (Aliyu *et al.*, 2020).

Generally in this study adults of all breed were more infected than the young once however, the different in infection rate between the age of sheep and cattle were statistically insignificant but significant between the young and adult goats. This agreed with previous report of Jegede *et al.* (2015) and Luka *et al.* (2018) but contrary with other studies which show that adult and old animals develop acquired immunity against helminthic infections as they get mature due to repeated exposure and this will help expel the parasite before it establish itself in the gastrointestinal tract (Dagnachew *et al.*, 2011; Usman, *et al.*, 2023).

Similarly, nine (9) parasites species were identified *Ascaris lumbricoides* 34%, *Ancylostom*spp 19%, *Trichostrongylus* spp 17%, *Strongyloides stecoralis* 11%, *Trichuris globulosa* 10%, *Haemonchus contortus* 5%, *Entoribius vermicularis* 2%, *Fasciola hepatica* 1% and *Eimeria faurei* 1%. All these species of intestinal parasite were previously reported by many researchers with different prevalence rates (Yuguda *et al.*, 2018; Usman *et al.*, 2023). The difference in prevalence rate by species and coinfection depend on the management system, exposure, location, awareness and environment of the animals (Yuguda *et al.*, 2018). In this study *Ascaris lumbricoides* was recorded in high prevalence (34%) in all the three species of the animals examined and all other species encountered were reported by various researchers in different parts of the country with different prevalence rate on ruminant's animals (Usman, *et al.*, 2016; Aliyu *et al.*, 2020 and Yuguda *et al.*, 2018). Many factors may be responsible for this variation ranging from agro-climatic variations (Akanda *et al.*, 2014), environmental factors and managements system among others.

CONCLUSION

In conclusion, the result of this study revealed high prevalence of intestinal parasites among ruminant animals reared and the species of parasite in this study area. Also, the species encountered have the zoonotic potentials that can threaten human and other animal's

health. Educating farmers on the benefit of regular deworming of their animals is recommended.

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CONFLICT OF INTERESTS

There is no any conflict of interest.

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