GASTRO INTESTINAL PROTOZOA AND HELMINTHS INFESTATION IN GOATS SLAUGHTERED WITHIN LOKOJA METROPOLIS, KOGI STATE.

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ABSTRACT

This study evaluates the Gastrointestinal Protozoa and Helminths in Goats slaughtered within Lokoja Metropolis, Kogi State, Nigeria. A total of 230 fecal samples were collected from various locations in Lokoja, Kogi State through October-November, 2022. Flotation technique was employed for the isolation of gastrointestinal parasite eggs in the fecal samples using microscope. The result indicated six parasites ova from different genera in the samples. These include; Strongyloidespp, Haemonchusspp,Trichurisspp, Eimeriaspp, Moniezaspp and Entamoeba spp. Haemonchusspp was the most prevalent parasite encountered 34 oocytes (26.8%), followed by Strongyloidesspp 23 oocytes (18.1%), Eimeriaspp 22 oocytes (17.3%), Trichurisspp 21 oocytes (16.1%) while Entamoebaspp 16 oocytes (12.6%) and Monieziaspp was the least prevalent 11 oocytes (8.7%). It was also observed that Does were more susceptible to gastrointestinal parasite than bucks. Similarly, more parasites were found among adult goats than younger ones. TheChi-square test of this research work revealed that there was no statistically significant differences in infections between sex, age and breed. However, Goat keepers should practice proper sanitation and maintain hygienic environmental conditions to reduce the survival of oocytes in these areas.

Keywords: Gastrointestinal, Helminths ,Oocytes, Protozoan. Goats, Lokoja

1.0   INTRODUCTION

Domestic goat is among the most primitive animals domesticated by man. They are widely distributed across the world with higher concentrations in tropical areas and in dry zones. (Di Cerbo*et al.,* 2010). It was also documented that goats are the principal domesticated small ruminants in terms of total numbers and production of food (Nwigwe, 2013). Goats are excellent meat producers for human consumption,as a result of its short generation intervals and the absence of religious restrictions associated with their meat, and also as rich sources of protein, they can help bridge the gap of protein malnutrition among consumers (Ozung*et al.,* 2011).

According to Dunn (2005), the intestine of goat is used to make catgut, an essential material for internal human surgical sutures, as well as string for musical instruments. Thefaeces of Goats also serve as manure, which is of special importance in those areas where cattle dungs are less available or too harsh to be used.

Helminthiasis is the most common cause of diarrhea in ruminants, as both young and old animals are susceptible to it, due to overgrazing of pastures animals are forced to graze closely to faecal materials, where the parasite infectivity concentration is highest (Schoenian, 2007). The continuous effort to increase meat production for protein needs of the ever increasing world population is faced with severallimitations (Boes*et al*.2009).Among which are diseases caused by intestinal helminths and protozoa (Aliaga-Leyton*et al.* 2011). The diseases are usually picked up by the ingestion of the infective eggs or larvae or by its penetration though the animal's skin (Githigia*et al*. 2001). A number of Goats infected have been shown to be asymptomatic or only minor symptoms, because of this they are often disregarded till serious complication or chronic clinical symptoms occurs (Rausch and Jentoft 2002). Gastrointestinal parasites are very common in both temperate and tropical countries, but more rampant in warm countries due to poor sanitation and low standard of living (Schmidt *et al*. 2000). According to Jones (2005) inadequate care, unhygienic environment, extreme weather conditions and close contact with infected animals, are predisposing factors to a variety of parasitic infestations. Therefore, the subclinical parasite infestations are responsible for substantial economic losses encountered in animal production (Kaplan, 2006; Tibbo*et al.,* 2006). Economic losses caused by Gastrointestinal (GIT) parasites vary from lowered fertility, reduction in work capacity, spontaneous culling, decreased feed intake, lowered weight gain, as well as decreased milk production, increased treatment cost and mortality in heavily parasitized animals (Fikru*et al.,* 2006). The direct losses caused by this parasite are credited to acute disease and death, premature slaughter and rejection of some parts during meat inspection, whereas indirect losses include the reduction in animal's productive potential (Gonzalez, 2004).

Due to the economic importance of helminths and protozoan infections in goats and their impact on public health, it was imperative to carry out this study to determine the prevalence of gastrointestinal parasites of goats in Lokojaand to educate goat owners on its transmission and proper control measures.

2.0   MATERIALS AND METHODS
2.1 Study Area
The study was conducted in Lokoja metropolis. Lokoja is located in Kogi State. It lies at the confluence of Niger and Benue rivers and it is the capital of Kogi State. Having an estimated population of over 90,000 inhabitants. It is close to the federal capital of Nigeria, Abuja. Lokoja lies between latitude 7°45'N and 7°51'N and longitude 6°41'E and 6°45'E. The state is surrounded by two major rivers which are River Niger and River Benue. It lies in the western bank of the River Niger at an altitude of 45-125 metres above sea level towards the Northwest which reaches an altitude of 400m above sea level.The state has two distinct weather, dry season between November and February and rainy season between March and October. Lokoja is generally hot throughout the year with average maximum temperature of 33.2°C and minimum temperature of 22.8°C. Annual rainfall ranges from 1016mm to 1524mm and average humidity of 68-70 percent.

2.2 Materials and Reagents

A total of two hundred and thirty (230) faecal samples from five (5) areas in Lokoja metropolis were examined in this research.

Materials used for this study include: gloves, sampling bottles, glass slides, syringes, normal saline, microscope, centrifuge, cotton wool, ethanol, nose mask, beaker, funnel, pipette, Cheese cloth, test tubes.

2.3 Sampling Technique

A total of about 230 samples of feaces of different goats were collected randomly from different locations in Lokoja, Kogi state for a period of two months. The areas of collection, sex, age, breed was noted. The collected samples were taken to the laboratory for processing and analysis. The samples was coded accordingly to reflect the various types and locations of collected samples.

2.4 Laboratory Techniques

Direct microscopic examination and NaCl flotation techniques were employed in the course of this study. Identification of egg and oocytes was carried out based on morphological features and sizes of the eggs. Fecal samples were prepared on glass slides using saturated salt solution (normal saline) and covered with slide cover slips. Slides were observed for helminths eggs, oocytes and larvae under X10 and X40 microscopic objective lens(Long, 1982).

2.5 Direct Microscopic Examination

A tiny amount of the samples were placed on glass slides and a drop of NaCl solution was added. Faecal loop was used to mix both to form smear, after which it was covered with a cover slip and was mounted on microscope for examination. Slides were examined under X10 and X40 objective lenses for identification of organisms(Long, 1982).

2.6 Flotation Technique

Samples were dissolved in flotation fluid (NaCl) and stirred with fecal loop to break the solid debris. The mixture was then strained to flotation cup using Cheese cloth. Flotation fluid was added until bubbles are formed in the mixture. Floatation cup was then covered with glass cover slips and was set aside for about 10-15 minutes. The cover slip was then removed from the set up and placed on a glass slide and observed under microscope.

2.7 Data Analysis

Data was analyzed using descriptive statistics, which includes median as the measure of central tendency, and frequency where the main outcome was the presence or absence of helminthes eggs, oocytes and larvae. Percentage positivity of gastrointestinal parasites was also calculated.

3.0 RESULTS AND DISCUSSION

3.1 Prevalence of Gastrointestinal Protozoan and Helminths in Goats within Lokoja Based on Location.

 shows the Prevalence of gastrointestinal protozoa and helminths in goats within Lokoja Metropolis according to locations,Adankolo had the highest prevalence rate of 36 (78.2%), while Ganaja had the lowest prevalence rate of 18 (39.1%).The presence of protozoan parasites such as *Eimeriaspp* and *Entamoebaspp* may be attributed to

overcrowding, poor management and hygiene. As reported by Adejinmi and Osayomi(2010), the presence of protozoan parasites in dog is as a result of overcrowding and poor hygienic condition. This is because poor hygienic condition and overcrowding encourages the spread of gastrointestinal parasites, as the animals become carriers of the intestinal parasites and continually contaminate the environment with eggs of the parasites.

Table 1 **Prevalence of Gastrointestinal Protozoan and Helminths in Goats Within Lokoja Metropolis According to Location.**

Area of collection of samples	No. of samples collected	No. of samples infected	Prevalence (%)
Old market	46	30	62.2
New market	46	20	43.4
Adankolo	46	36	78.2
Felele	46	23	50.0
Ganaja	46	18	39.1
Total	**230**	**127**	**55.2**

3.2 Overall Prevalence of Gastrointestinal Protozoan and Helminths in Goats Within Lokoja

As seen in, 127 (55.2%) of the samples were found to be positive for protozoa and helminths oocytes, egg, larvae. Six species of Heliminths and protozoan were identified and their prevalence of infection was calculated, the samples examined were infected with one or more gastrointestinal parasites. where*Strongyloidesspp* had a prevalence rate of 23 (18.1%), *Haemonchusspp* had a prevalence rate of 34 (26.8%), *Trichurisspp* had a prevalence rate of 21 (16.5%), *Eimeriaspp* had a prevalence rate of 22 (17.5%), *Moniezaspp* had a prevalence rate of 11 (8.7%), *Entamoebaspp* had a prevalence rate of 16 (12.6%). This was in conformity with the findings of (Gadahi*et al.,* 2009) and (Nwigwe*et al.,* 2013) who noted that the most pathogenic helminths and protozoan parasites in the intestinal tract of small ruminants such as goat includes; *Strongyloidesspp,Trichurisspp* and *Eimeria* species. High prevalence of gastrointestinal parasite of Goats in this study is also similar to the findings of (Mollah*et al.,* 2016) who examined 250 goats and recorded *Haemonchus* and *Strongyloides* species as the dominant helminths parasites in Goats, and are among the popular parasites of animals because of their efficient life cycle ranging from the very simple to the extremely complicated stage. The prevalence in the present study (55.2%), might be due to the system of management ofthese Goats, as they were always left to wander about scavenging and feeding indiscriminately on anything they come in contact with, and then return to their poorly kept pens. The Goats are exposed to gastrointestinal parasites when they are maintained in an unhygienic and poorly kept ranches, and also when fed with contaminated food and water.

*Table 1***Overall Prevalence of Gastrointestinal Protozoan and Helminths in Goats Within Lokoja Metropolis in Kogi State.**

Parasite egg	Number positive	Prevalence (%)
Strongyloidesspp	23	18.1
Haemonchusspp	34	26.8
Trichurisspp	21	16.5
Eimeriaspp	22	17.3
Moniezaspp	11	8.7
Entamoebaspp	16	12.6
Total	**127**	**100**

3.3 Prevalence According to Sex

indicates the distribution of gastrointestinal parasites in relation to the sex of the Goats examined. Out of the 230 fecal samples examined, 103 (45.24%) from Bucks and 127 (54.76%) from Does. Based on the finding of this study in relation to the sex, Does are more susceptible to gastrointestinal parasites (31.7%) than Bucks (23.5%). Higher incidence among Doesmight be due to genetic pre-disposition and differential susceptibility owing to hormonal differences. This agrees with report of Shakya*et al. (*2017) who also noted thatother factors associated with higher incidence of gastrointestinal parasite among Does includes pregnancy and lactation stress, having found higher incidence of gastrointestinal parasites in Does (46.04%) than Bulls (39.5%).

*Table 1***Prevalence of Gastrointestinal Protozoan and Helminths in Goats Within Lokoja Metropolis in Lokoja, Kogi State According to Sex.**

Sex	No. examined	No. positive	Prevalence (%)
Male	103 (45.24)	54	23.5
Female	127 (54.76)	73	31.7
Total	**230**	**127**	**55.2**

3.4 Prevalence According to Age

expresses the distribution of gastrointestinal parasites in relation to the age of the Goats examined. Out of a total of 230 Goats examined, 91 (39.6%) are below the age of 1 year and are considered as young, while 139 (60.4%) are above 1 year. From the result obtained, more parasites was found among adult Goats (38.7%) than younger ones (16.5%). Higher prevalence of the parasites among adult Goats, maybe attributed to differential exposure, as a result of the continuous grazing on pasture land by the adults, and these pastures happens to be infected with larvae andeggs of gastrointestinal parasites shed by other older Goats, while the young ones which are generally kept at home.This is in conformity with the findings of Chedge*et al. (*2013) who found 57% and 22% prevalence of gastrointestinal parasites for adult and young goats respectively.

However, several authors have documented that adult and old animals develop acquired immunity against helminthes infections as they get mature due to repeated exposure and this will help expel the parasite before it establish itself in the gastrointestinal tract (Urquhart *et al.,* 2003; Dunn, 2005; Tasawar*et al.,*2010; Dagnachew*et al.,* 2011).

Table 1 **Prevalence of Gastrointestinal Protozoan and Helminths in Goats Within Lokoja Metropolis in Lokoja, Kogi State According to Age.**

Age	No. examined	No. positive	Prevalence (%)
Young (< 1 year)	91 (39.6%)	38	16.5
Adult (> 1 year)	139 (60.4%)	89	38.7
Total	230	127	55.2

3.5 Prevalence According to Breed

Illustrates the prevalence of gastrointestinal protozoan and helminths in Goats according to breed. West African dwarf goats had higher infection rate (56.1%) than Kano Brown goats, which had a least infection rate of (43.9%).

Table 1 **Prevalence of Gastrointestinal Protozoan and Helminths in Goats Within Lokoja Metropolis in Lokoja, Kogi State According to Breed.**

Breeds	No. examined	No. positive	Prevalence (%)
West African dwarf	129 (55.5)	90	56.1
Kano brown	101 (44.5)	37	43.9
Total	230	127	55.2

Table 2 **Morphological Features of Gastrointestinal Protozoan and Helminths in Goats Identified in Lokoja, Kogi State.**

Gastrointestinal parasites	Size of egg	Morphological features
Strongyloidesspp	40x55 µm	thin wall, ellipsoidal in shape
Haemonchusspp	78-85 µm	Papilla like spine, red in colour
Trichurisspp	30x45 µm	Thin wall, double shell
Eimeriaspp	31x24µm	Ovoid, thin wall and brownish.
Moniezaspp	70 µm	Scolex, segment of proglottids
Entamoebaspp	12x15 µm	Cyst, trophozoite, spherical in shape

| 4.0 | CONCLUSION AND RECOMMENDATIONS |

4.1 Conclusion

The findings of the present study has established a prevalence of gastrointestinal protozoan and helminths of goats to be 55.2%. A total of six parasites belonging to six different genera were recorded, which includes*Strongyloidesspp, Haemonchusspp, Trichurisspp, Eimeriaspp, Moniezaspp and Entamoeba spp. Haemonchus spp*. being the most prevalent parasite encountered. The present study indicated that sex, age, and breed are important factors which influence the prevalence of gastrointestinal protozoan helminths of goat in Lokoja, Kogi State Nigeria.

It was observed that Does are more susceptible (31.7%) to gastrointestinal parasite than bucks and (23.5%) more parasites are found among adults (38.7%) than younger ones (16.5%).

4.2 Recommendations

Proper sanitation and hygienic environmental conditions should be maintained to reduce the survival of oocytes in these areas.Public awareness and sensitization programs should be organized to educate the general public about the occurrence and the economic significance of gastrointestinal parasites. Farmers should consult registered veterinarians routinely for professional advice on good management practices, and handy tools to minimize the occurrence and spread of diseases, maximum hygienic measures should be practiced in handling utensils (like feeding and watering troughs) used in animal houses and within the farm area.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

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