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Research Article

Prevalence of Gastrointestinal Helminths in Exotic and Indigenous Goats Slaughtered in Selected Abattoirs in Port Harcourt, South-South, Nigeria

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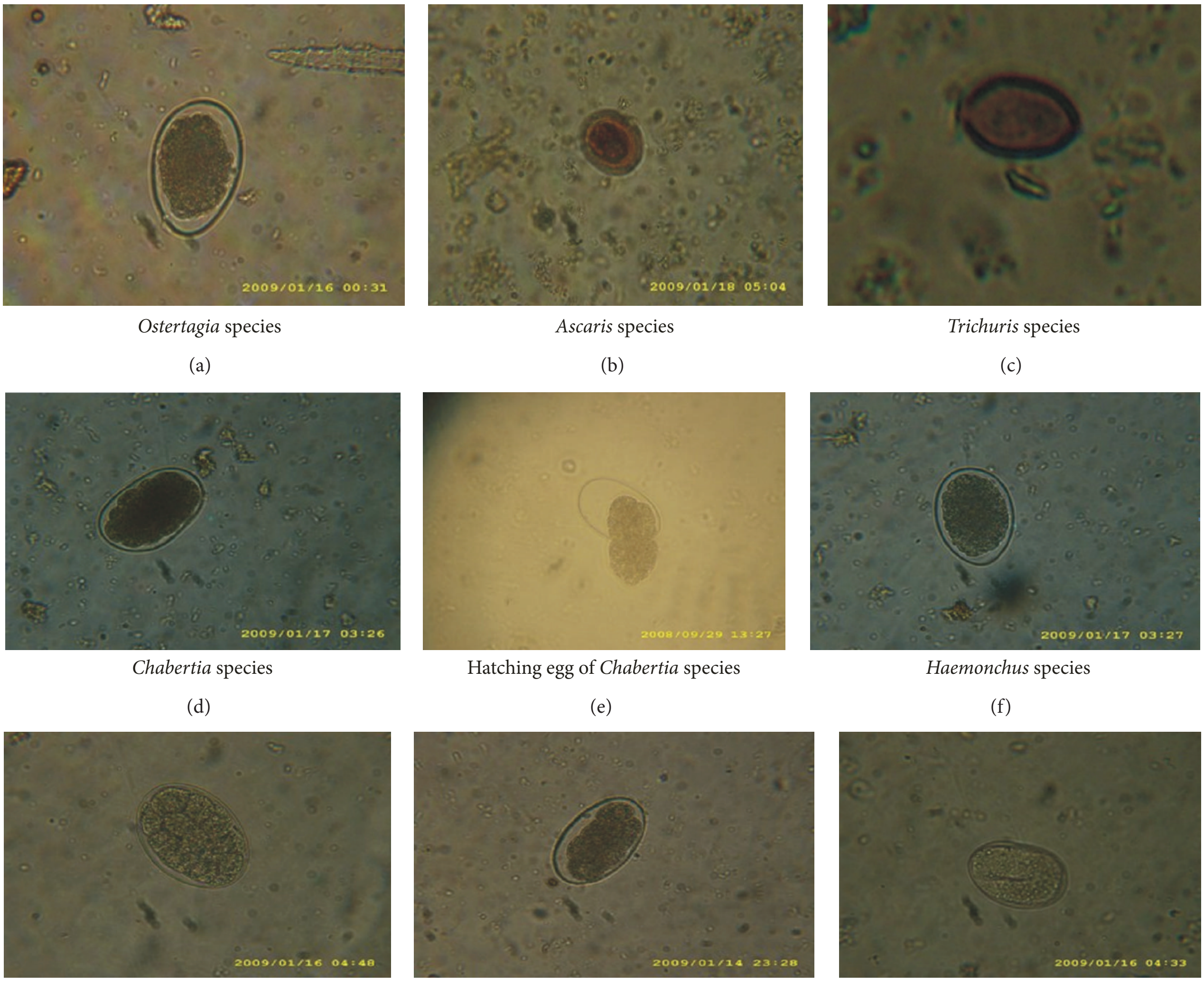
A total of 213 faecal samples were collected from four abattoirs and households to determine the prevalence of helminthes infections in exotic and indigenous goats in Port Harcourt, South-South, Nigeria. The study revealed that out of 153 exotic goats (Red Sokoto) Capra hircus, 112 were infected with various species of gastrointestinal helminths; out of 60 indigenous goats (West African dwarf) Capra hircus, 49 were also infected with various types of gastrointestinal helminths. The formol-ether concentration method was used to analyse the specimens. The study revealed that an overall prevalence of (75.5%) was recorded, out of which 57 (76.0%), 55 (70.5%), and 49 (81.6%) were recorded for exotic goat in the months of May–September, 2010, exotic goat in the months October 2010–February, 2011 and for indigenous goats, respectively. The overall prevalence amongst the infected animals was not statistically significant ($P > 0.05$). Species of helminthes revealed from the study were, *Haemonchus*, *Strongyloides*, *Chabertia*, *Trichuris*, *Ostertagia*, *Bunostomum*, *Trichostrongyloida*, *Ascaris*, *Tenia*, *Avitelina*, *Fasciola*, *Eurytrema*, *Gastrothylax*, *Schistosoma*, and *Dicrocoelium*.

1. Introduction

Ruminants, cattle, goats and sheep, represent an important source of animal protein in many countries of the world, supplying a good percentage of the daily meat and dairy products in cities and villages in such countries including Nigeria [1]. Apart from being the source of animal protein, their wastes are also very important in agriculture [1, 2]. These animals are used in special ceremonies such as wedding and burials in most parts of Nigeria. However, parasitic diseases coupled with inadequate management hampered the productive husbandry of these animals [2, 3].

Gastrointestinal parasitic infections are world-wide problem for both small and large-scale farmers, but their impact is greater in Sub-Saharan Africa due to the availability of a wide range of agroecological factors suitable for diversified hosts and parasite species [3]. Gastrointestinal parasites are known to be widespread in Nigeria [4, 5] and limit ruminant production in many areas of the country [5, 6]. The direct losses caused by these parasites are attributed to hyper-acuteness and death, premature slaughter, and rejection of some parts at meat inspection, whilst indirect losses include the reduction in productive potential such as decreased growth rate, weight loss, diarrhea, anorexia, and sometimes anaemia [7–9].

Helminths or worms cause a wide range of health problems to both man and animals [10]. Helminthiasis, in large part, is caused by members of the phyla Nematoda and Platyhelminthes [11]. Species belonging to both phyla occupy numerous niches within their mammalian hosts, ranging from intestinal lumen to intravascular and even intracellular sites [12]. They are responsible for substantial loss of productivity in the livestock industry. Their harmful effects on these animals range from gastroenteritis, anorexia, abdominal distention, diarrhoea, emaciation, and so forth; all of which result in serious economic losses to the farmer and the nation in general [13]. Similarly, they constitute a major impediment to efficient and profitable livestock production [14].



Ostertagia species (a); *Ascaris* species (b); *Trichuris* species (c); *Chabertia* species (d); Hatching egg of *Chabertia* species (e); *Haemonchus* species (f); *Bunostomum* species (g); *Trichostrongylus* spp. (h); *Strongyloides* species (i)

Figure 1: Eggs of Nematodes as seen under the ×40 objective of the microscope on slides stained with Lugol's iodine.

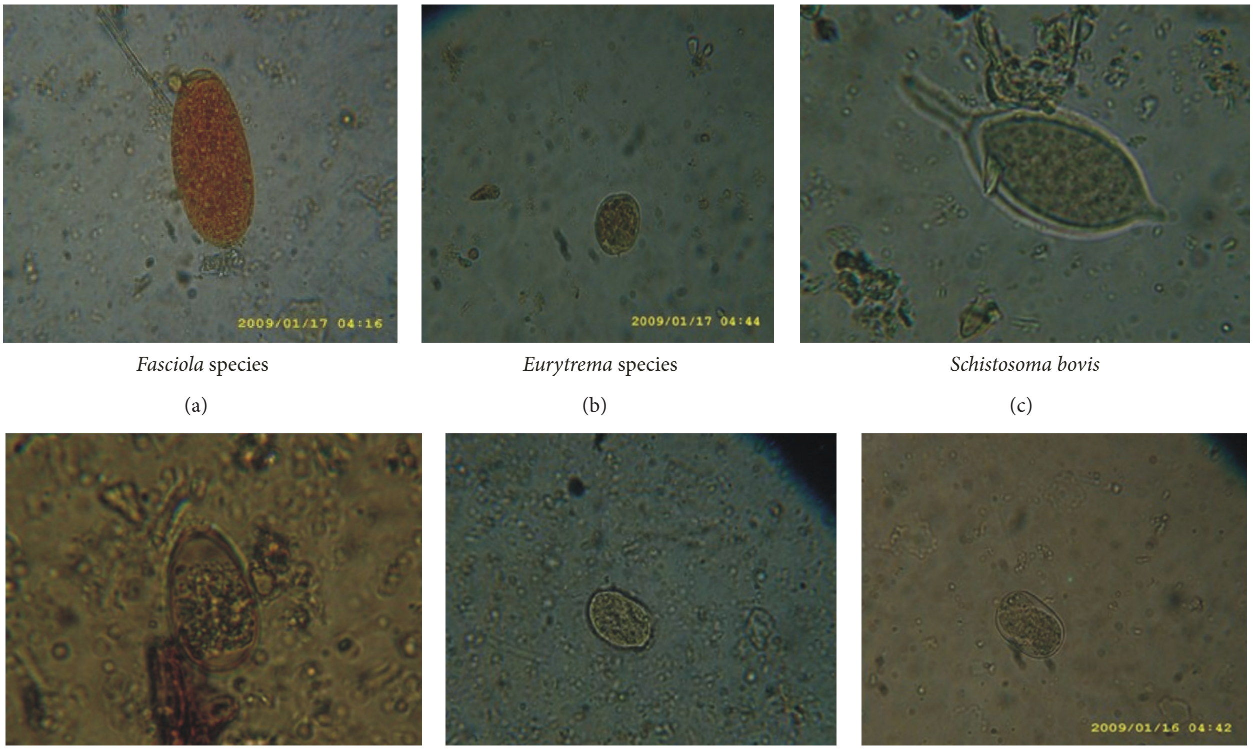
The prevalence of gastrointestinal helminths is related to the agroclimatic conditions like quantity and quality of pasture, temperature, humidity, and grazing behavior of the host [15]. However specific parasites may be distributed throughout the world; they have different impact according to production system, management, and geoclimatic conditions [11].

The information on the prevalence and distribution of various species of gastrointestinal parasites of cattle and goats kept by the nomadic Fulani's in Nigeria and those in Port Harcourt are important in the formulation of control strategies for the nomads and other farmers.

2. Materials and Methods

2.1. Study Area. The study was conducted in Port Harcourt City, South-South, Nigeria. Obio/Akpor and Port Harcourt city Local governments are commonly referred to as Port Harcourt city. It is situated on the bonny River within the Niger Delta, South-South, Nigeria. The study area lies between latitude 4^0 40^1 and 7^0 10^1 to longitude 7^0 55^1 east of the Greenwich meridian. It is situated some 60 km from the open sea, which is immediately where the coastal marshes give way to the land of the interior. Four abattoirs were selected from Rumuodumaya: Ogbogoro, Eliozu, and Aluu communities in the study.

2.2. Collection of Faecal Samples. Faecal specimens were collected from goats in the four aforementioned community abattoirs and individual homes in the study area. Animals were usually slaughtered early in the morning between the hours of 6.30 am and 8.00 am daily for a period of ten months (May, 2008 to February, 2009). Faecal samples were randomly collected weekly from the intestines of slaughtered animals (exotic and indigenous). The samples were collected in clean



Fasciola species (a) | *Eurytrema* species (b) | *Schistosoma bovis* (c)

Gastrothylax species (d) | *Schistosoma japonicum* (e) | *Dicrocoelium* species (f)

Figure 2: Eggs of Trematodes as seen under the ×40 objective of the microscope on slides stained with Lugol's iodine.

labeled sterile vials, preserved in 10% formalin, and taken to the laboratory for microscopic examination.

2.3. Laboratory Examination. The formol-ether concentration technique [16] was used to analyze the samples. 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 it 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 was 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 deposit was mixed by tapping the tube with the finger and using a Pasteur pipette. A drop of the sediment was applied on a microscope slide, covered with a cover slip, and examined under the microscope using ×10 and ×40 objectives. Lugol's iodine was also used as a stain (Figures 1, 2, and 3).

3. Results

A total of 75 exotic goats were examined between the months of May and September 2010. Fifty-seven (57) were infected with various species of gastrointestinal helminths as follows (see Table 1).

A total of 78 exotic goats were examined between the months of October 2010 and February 2011. Fifty-five (55) were infected with various species of gastrointestinal helminths as follows (see Table 2).

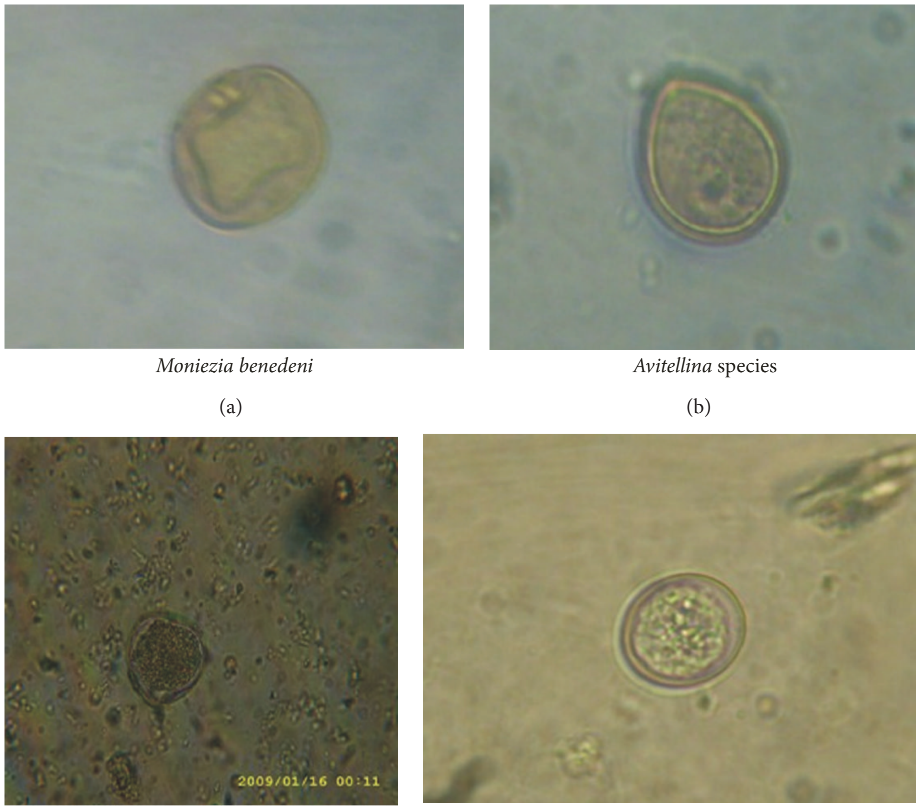
A total of 60 indigenous goats were examined in four communities during the period of study. Forty-nine (49) were infected with various species gastrointestinal helminthes as follows (see Table 3).

4. Discussion and Conclusion

The result of the study clearly indicates a high prevalence rate of gastrointestinal helminthes in cattle slaughtered in four selected abattoirs in Port Harcourt, namely, Eliozu, Ogbogoro, Rumuokoro, and Aluu abattoirs and various homes of indigenous people within the area.

The study revealed that 73.2% of the sampled exotic goats and 81.6% of indigenous goats were infected with various species of helminthes parasites. The goat slaughtered between May and September, 2009 had a prevalence rate of 76.0%, October 2009 and February, 2010 had a prevalence rate of 70.5%, while indigenous goat had 81.6% prevalence rate (see Tables 1 and 2, resp.). These results are consistent with findings of different researchers in the semiarid zone of North-Eastern and South-Eastern Nigeria [17–19].

The helminthes community isolated consisted of sixteen parasitic species, eight (8) nematodes (*Haemonchus*, *Strongyloides*, *Chabertia*, *Trichuris*, *Ostertagia*, *Bunostomum*,



Moniezia benedeni

(a)

Avitellina species

(b)

Moniezia expansa

(c)

Tenia species

(d)

Figure 3: Eggs of Cestodes as seen under the ×40 objective of the microscope on slides stained with Lugol's iodine.

Trichostrongylus, and *Ascaris*), three (3) Cestodes (*Taenia*, *Moniezia,* and *Avitellinium*), and five (5) (*Dicrocoelium*, *Fasciola*, *Eurytrema*, *Gastrothylax,* and *Schistosoma*). *Haemonchus* species have the highest prevalence in all the positive samples. Fakae (1990) studies the epidemiology of helminthosis in ruminants under the traditional husbandry system in eastern Nigeria and reported prevalence of *Haemonchus* species as (87.1), higher than other helminthes species. It has been suggested that *Haemonchus* species can acquire resistance faster than any other gastrointestinal nematodes, like *Trichostrongylus*, because of its high biotic potential [20]. The area of study shows how vulnerable workers in the abbatoir and people who consume the intestinal parts of the animals may be to infections especially to *Taenia* and *Fasciola* which are zoonotic and were observed in course of study. Globally, parasitic and other endemic diseases continue to be a major constraint on profitable livestock production. They are rarely associated with high mortality and easily identifiable clinical signs and their effects are usually characterized by lower outputs of animal products, by products, manure, and traction, all contributing to production and productivity losses.

5. Conclusion

In conclusion, various gastrointestinal parasites have been found in cattle in the study area. Hence, the high prevalence rate of helminthiasis in livestock needs to be checked periodically. Regular control measures should be practiced and farmers educated in the proper use of antihelminthiasis. Epidemiological facts suggest that high standard of sanitation in modern animal husbandry will prevent exposure of livestock to graze in deteriorated and environmentally polluted range lands will be effective in controlling disease.

6. Recommendation

The following recommendations will help in the prevention or reduction of helminth infections in the study area.

(i) There should be legislative control over slaughtering of goats and their distribution; the abbatoir workers should be properly trained on meat handling and zoonotic infections.

(ii) Animals should be restricted to special areas of land provided by the government for grazing.

(iii) The public should be enlightened on proper cooking of animal parts especially the intestine.

(iv) A comprehensive approach should be adopted to ensure all inclusive meat inspection in the abattoirs before distribution to the public for consumption.

Table 1: Species of helminths in exotic goats between the months of May 2008 and February 2009.

	Parasite type						Nematodes					Cestodes					Trematodes		
Months	Numbers examined	Numbers infected	*Haemonchus*	*Strongyloides*	*Chabertia*	*Trichuris*	*Ostergia*	*Bunostomum*	*Trychostrongyloides*	*Ascaris*	*Tenia*	*Moniezia*	*Avitelina*	*Fasciola*	*Eurytrma*	Gastrotylax	*Schistosoma* spp	*Dicrocoelium*
May	13	9	2	0	1	0	1	0	0	1	0	1	0	2	0	1	0	0
June	17	14	4	2	1	0	0	1	0	1	1	1	1	1	0	1	0	1
July	16	13	3	0	1	1	2	1	0	0	0	3	0	1	0	1	0	0
August	15	11	2	1	1	1	0	1	1	0	1	0	0	1	0	1	0	1
September	14	10	2	1	1	0	1	0	0	0	0	2	1	2	0	1	0	0
Total	75	57 (76)	13 (17.3)	4 (5.3)	5 (6.6)	2 (2.6)	4 (5.3)	3 (4)	1 (1.3)	2 (2.6)	2 (2.6)	7 (9.3)	2 (2.6)	7 (9.3)	0	5 (6.6)	0	2 (2.6)

Table 2: Species of helminthes obtained between the months of October 2008 and February 2009 from exotic goats.

Parasite type			Nematodes							Cestodes					Trematodes			
Name of abattoir	Numbers examined	Numbers infected	*Haemonchus*	*Strongyloides*	*Chabertia*	*Trichuris*	*Ostergia*	*Bunostomum*	*Trychostrongyloides*	*Ascaris*	*Tenia*	*Moniezia*	*Avitelina*	*Fasciola*	*Eurytrma*	Gastrotylax	*Schistosoma* spp	*Dicrocoelium*
October	14	9	2	1	0	0	1	1	0	0	0	1	0	1	0	1	0	1
November	16	12	2	0	1	1	1	1	0	1	0	2	0	1	0	1	1	0
December	16	10	2	1	0	1	1	0	1	0	1	1	0	0	0	0	2	0
January	17	13	2	2	1	0	0	1	1	1	0	2	0	1	0	1	1	0
February	15	11	3	1	1	1	0	0	0	0	1	2	0	1	0	0	1	0
Total (%)	78	55 (70.5)	11 (17.1)	5 (6.4)	3 (3.8)	3 (3.8)	3 (3.8)	3 (3.8)	2 (2.5)	2 (2.5)	2 (2.5)	8 (10.2)	0	4 (5.1)	0	3 (3.8)	5 (6.4)	1 (1.2)

Table 3: Species of helminths obtained from indigenous goats.

Parasite type							Nematodes						Cestodes				Trematodes		
Name of abattoir	Numbers examined	Numbers infected	*Haemonchus*	*Strongyloides*	*Chabertia*	*Trichuris*	*Ostergia*	*Bunostomum*	*Trychostrongyloides*	*Ascaris*	*Tenia*	*Moniezia*	*Avitelina*	*Fasciola*	*Eurytrma*	Gastrotylax	*Schistosoma* spp	*Dicrocoelium*
Eliozu	15	10	3	2	2	0	1	0	0	2	1	0	0	1	0	1	0	1
Ogbogoro	15	14	3	2	0	0	1	0	1	2	0	1	0	2	1	0	0	0
Aluu	15	13	2	2	1	0	0	2	2	1	1	1	0	1	1	0	0	0
Rumuokoro	15	12	3	2	1	0	1	1	1	0	0	0	0	1	0	0	0	0
Total (%)	60	49 (81.6)	11 (18.3)	8 (13.3)	4 (6.6)	0	3 (5)	3 (5)	4 (6.6)	5 (8.3)	2 (3.3)	2 (3.3)	0	4 (6.6)	2 (3.3)	1 (1.6)	0	1 (1.6)

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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