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Prevalence of Eimeria Oocysts in West African Dwarf goats at the University of Ibadan Farm

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Abstract

An outbreak of acute coccidiosis is reported in West African Dwarf (WAD) goats kept under semi-intensive management system at the University of Ibadan farm. During the period of the outbreak, clinical signs observed among the animal included anorexia, fever, coughing, ocular and nasal discharges and diarrhoea. Sixty nine out of eighty-five (85%) animals were scouring, 6 out of 20 (30%) pregnant does aborted, 8 out of 80 (10%) died through severe infection. Average oocyst counts was 2.73 x 10^3/gram faeces in kids and 0.9 x 10^3/gram faeces in adult goats. Eimeria species predominant in goats and percentage occurrence were E. arloingi (77.5%), E. ninakohlyakimovae (62.89%), E. hirci (58.6%). E. alijevi (39.5%). Areas of glandular degeneration and necrosis of epithelium of the small intenstine were seen. Also coccidia schizonts, immature oocysts, and neutrophilic infiltrations can be seen in the intestinal mucosa. The presence of pathogenic species of the Eimeria in WAD goats suggest that coccidiosis may be contributing to the enteric syndromes, poor feed conversion and low productivity.

Keywords: *Coccidiosis, WAD goat, Eimeria, Oocysts*

Introduction

Coccidiosis is a parasitic disease caused by protozoa of the phylum Apicomplexa, of the family Eimeriidae (Soulsby, 1971, 1982). Coccidiosis in sheep and goats is reported to be mostly prevalent in young animals between four to six months of age (Soulsby, 1982) but can occur in any age. It occurs commonly in all domesticated animals and is an important disease in goats (Waruiru *et al.*, 1991; Mushi *et al.*, 1993).

Coccidiosis in goats is caused by various species of Eimeria, such as E. arloingi, E. hirci, E. alijevi, and E. ninakohlyakimovae regarded as the most outbreak (Pellerdy, 1973)

Although several workers have reported other of Eimeria in goat (Kusiluka *et al.*, 1996, Koudela and Bokova, 1998), few studies on the West African Dwarf goats have reported in Nigeria. Therefore, this study was carried out to determine the prevalence and effect of coccidiosis on young and adult WAD goats.

Materials and methods

Eighty West African Dwarf (WAD) goats were examined in this study, carried out between January and November, 1995. The goats were housed during the night and left on an open pasture during the day. They were vaccinated against des petit Ruminant (PPR) using tissue culture Rinderpest vaccine (TCRV), NVRI,

Table 1 *The percentage occurrence of goats Eimeria species in 80 faecal samples*

Eimeria Species	Percentage occurrence of various eimeria occysts in the samples collected
E. arloingi	77.5
E. ninakohyakimovae	62.8
E. hirci	58.6
E. alijeri	39.5

Vom Nigeria), dewormed using Levamisole Hydrochloride (Citarin® - L 2.5%, Bayer Leverkusen) and placed on broad spectrum antibiotic regime. Animals were of both sexes (52 males, 28 females) and aged between six to eighteen months. Faeces were collected per rectum from 62 adult goats and 18 weaner kids and screened for coccidia species. Faeces collected from screened animals that were positive were pooled, processed oocysts finely concentrated by floatation using Sheather's sugar solution (Levine *et al.,* 1962). Oocysts were recovered from these faeces by the sugar floatation test, a cover slip being placed gently over the bottle. The Cover slip was removed 20-30 minutes later and examined under light microscope (x40 objective, x 10 ocular) and measured on the scale of ocular micrometer resulting headings transposed into microns (Christensen, 1941; Majaro, 1980). Sporulation test was carried out by incubating faecal samples that tested positive in 2.5% potassium dichromate solution agigated in water bath at room tempterature of 29.0 ± 1.0^{0}C. A modified McMaster technique (Anon, 1971) was employed for faecal egg and oocysts counts. Identification of the occuring occysts was based on the occysts size morphology and post-mortem lesions (Christensen, 1938; Majaro 1980; Newman *et al.,* 1968 and Pellerdy, 1974). Blood sample was taken from each goat and screened for haemoparasites. All the goats were negative for parasitaemia. Post mortem examination was performed on dead carcasses and histological examination of tissue sections was done.

Results

The early clinical symptoms shown by the disease goats included, anorexia, fever, coughing, ocular and nasal discharges. Within the following 3 to 4 days, the goats began passing blood-tinged watery faeces and became weak, unthrifty and dehydrated. Sixty out of 80 (85%) were scouring, 8 out of 80 (10%) died due to severe infection, 6 out of 20 (30%) pregnant does aborted. The species found included Eimeria arloingi, E. ninakohlyakimovae, E. hirci and E. alijevi. The distribution of the species is shown in Table 1. The commonest species found was E. arloingi (77.5%).

The average measurement of the predominant set of oocysts were 27.8 x 20.7 microns with a rather wide range from 14.1 to 35.8 microns in length and from 10.0 to 25.6 microns in width. They were either ellipsoidal or slightly ovoid. The oocysts wall composed of 2 layers with a microple at one end. The oocysts resembled those of E. arloingi as described by Christensen (1938) and Manual of veterinary Parasitological Techniques (1986). The weaners had oocysts counts that were higher than in the adult goats with mean count 2.7 x 10^5 for the weaners and 0.9 x 10^3 for the adults (Table 2).

Table 2 *Oocyst counts in kids and adults WAD goats*

	Mean Oocysts/grams	Range
Kids	273.307	2x10-2x10^5
Adult	988	2x10-6x10

At necropsy, the carcasses were dehydrated and the intestinal mucosae were oedematous and had marked congestion. The intestinal contents were mucoid and watery. Histological examination of sections of the small intestine showed coccidial oocysts, macrogametocytes, microgametocytes, merozoites, and schizonts in various stages of development in the mucosa gladular epithelia cells. The lamina propria was infiltrated with round cells consisting of lymphocytes, plasma cells and few neutrophils. There was glandular degeneration and some portions of the mucosa showed necrotic changes.

Discussion

Clinical coccidiosis is goats in chiefly confined to young animals 4 to 6 months of age (Soulsby, 1971). Outbreak of the disease occurred in the present study when ranged-reared goats beween 6-18 months old were brought together under semi-intensive management. The infection might have been introduced by contamination of feed by feacal dropping of chickens which were occasionally attracted by the concentrates of goats or by some of the goats probably incubating the disease when they were purchased, and as a result of confinement and crowding, the output of oocyst in their faeces increased markedly and other goats became infected through feeding on contaminated hay and feed. This corroborates the report of Orlov (1970). The weaners had an oocysts count that was higher than in the adult goats. This is in agreement with the report of Mushi *et al., (1993)* and Koudela and Bokova (1998) which stated that kids have a significantly higher oocysts count than adults.

The mortality in the study was lower than 70% reported by Opoku-pare and Chinema (1979). This may be due to differences in age of the animals under study. It seems that the different climatic factors e.g moisture, rainfall and temperature did not influence the coccidial infestations in the study even though it has long been known that coccidiosis has seasonal incidence, coinciding with the report of Waruiru *et al., (1991)*; Mushi *et al., 1993)*; and Kusiluka *et al., (1998)*.

Six out of the eight infected pregnant does aborted and this may be due to stress, anorexia and unthriftiness. This is in agreement with the report of Lapage (1956) which stated that abortion is due to stress and unthriftiness in pregnant does. The clinical symptoms shown by the infected goats were synonymous with the reports of Opoku-pare and Chineme (1979); Pellerdy (1974); Koudela and Bokova (1998). *Eimeria arloingi*, was the predominant species in this study and it seems to be the most prevalent species in goats. It had been found in 58% of faecal samples in goats in Nigeria (Opoku-pare and Chinema 1979), 51% in goats in Botswana (Mushi *et al,,* 1993), 55% in goats in Tanzania (Kusiluka *et al.,* 1996), 70.7% in goats in kenya (Waruiru *et al.,* 1991) and 84% in goats in the Czech republic (Koudela and bokova, 1998).

Most cases had mixed infections or more than one coccidia in individual faecal sample. This complicates the interpretation of oocyst counts since some coccidia are pathogenic than others. This observation was synonymous to the report of Waruiru *et al.* (1991) and Mushi *et al.* (1993) *E. ninakohlyakimovae* is the most pathogenic species in goats (Orlovi, 1970). This species destroys the stem cells in the crypts of the caecum and or colon, leaving the mucosa devoid of epithelium. This species accounted for 62.8% in this study which is close to that of 58% reported in Nigeria goats (Opoku-pare and Chineme, 1979). *E.hirci* and *E. alijevi* are other pathogenic species but cause lower percentage of infection compared with *E.arloingi* and *E. ninakohlyakimovae.*

The overall presence of multiple species of coccidia makes diagnosis in individual cases difficult. The clinical had to rely on the history and clinical symptoms in the flock supported with high faecal oocyst counts to facilitate a correct diagnosis.

It is evident that most animals in this study had subclinical coccidiosis with consequent poor weight gains. Caprine coccidiosis could be very acute with high mortality rate in kids between 3 to 6 months of age (Lapage, 1956), particularly when they are confined under the intensive management system (Menezes *et al., 1997).* Unless adequate sanitation measures such as trough feeding, proper and regualr faecal and wet bedding disposal are practiced, the disease could be a serious hindrance to expected future increase in livestock development under intensive husbandry system in Nigeria.

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