PREVALENCE AND PATHOLOGY OF RABBIT COCCIDIOSIS IN NAIROBI COUNTY, KENYA.

A research project submitted in partial fulfillment for the award of the degree of Bachelor of Veterinary Medicine, UON.

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May 2015

DECLARATION

I hereby declare that this project is my original work and has never been submitted to any other universityor institution of higher learning for the award of any degree.

Signedé é é é é é é é é ..

Dateé é é é é é é é é é ..

Name.Ogachi James Nehemiah.

This project has been submitted for examination with my approval and a as a partial requirement for the degree of bachelor in Veterinary Medicine.

Signé é é é é é é é é é

Dateé é é é é é é é é é é é é é é

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DEDICATION

I dedicate this work to my family who have been supporting me through my five years of study, especially my father whose inspiration has brought me this far and lastly to my friends for their moral and material support.

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ABBREVIATIONS

1. UON- University of Nairobi
2. Vet. Lab- Veterinary laboratories

ABSTRACT

Study on the prevalence and pathology of rabbit coccidiosis was done by analysis of fecal samples for coccidian parasites. Post-mortems were done on rabbit carcasses from the county in an attempt to establish location and type of lesions in order to link them to the two most common forms of coccidiosis-hepatic coccidiosis and the intestinal form. The general prevalence of coccidiosis in the study area was found to be at 76.7%. According to the postmortems done, carcasses with intestinal lesions due to coccidiosis accounted for 87.5% of all carcasses while those with hepatic lesions accounted for 12.5%. Young rabbits were found to account for higher mortality rates at 87.5%. In Conclusion the prevalence rates for coccidiosis was found to be high and appropriate measures were recommended.

Key words: Prevalence, Coccidiosis, Rabbit, Intestinal, Hepatic. Nairobi County, Kenya

CHAPTER ONE

1.0 INTRODUCTION

Nairobi Countyis among the 47 counties of the republic of Kenya. The county has Nairobi city as it`s capital. The city also doubles as the national administrative and economic capital. The county covers an area of about 696km2 with a total population of over 3.4 million people and a population density of about 4,800/km2. This is a high population density of which most of them are found in the low income peri-urban areas (open data Kenya).It is in this highly inhabited peri-urban areas of the county such as Dagoretti, where most of the county`s rabbit farming is done. The total population of rabbits in Kenya is placed slightly over six million with Central, Rift valley, Western and Nairobi being the largest producers. The rabbit population is on the rise, majorly due to the increasing demand for rabbit meat due to the increasing prices of mutton, beef and poultry (N. Rangoma. 2012).The aggressive health campaigns against red meat has also made rabbit meat (white meat) an alternative source of proteins.In Nairobi County, tourist hotels have also played a role in the increased demand for rabbit meat.(M. Rangoma,2012). The fact that little space is require for rabbit hutches makes the enterprise a viable alternative in the densely populated county.

1.2 Justification

Rabbit farming is an upcoming and promising enterprise. This is mainly due to the increasing demand for rabbit meat and the fact that it requires minimal space and capital to practice. This has made it popular in the low incomeperi-urban parts of Nairobi County. Coccidiosis poses a major challenge among other constraints and therefore this study seeks to establish the prevalence and recommend control measures to avoid associated losses.

1.3 Overall objective

To study the prevalence and pathology of coccidiosis in rabbits in Nairobi County in Kenya.

1.4 Specific objective

i) Todetermine the prevalence and pathology of coccidiosis in different ages of rabbits.

ii) To determine the location of lesions.

iii) To determine the most prevalent lesions.

LITERATURE REVIEW

2.1 Epidemiology

This disease hasa world wide in distribution and affects rabbits of all breeds and may at times cause mortality especially in young rabbits. Coccidiosis is caused by a protozoan parasite in the phylum Apicomplexa, family Eimeriidae and genus Eimeria. They are intracellular parasites.(Nuszynski. 2011).The oocysts of what later was classified as Eimeriasteidai were first seen by a dutch microbiologist Antoni van Leeuwenhoek in bile of a rabbit in 1674. The genus is named after Theodor Eimer, a German zoologist. The disease is usually characterized by enteritis and diarrhea. An hepatic form does occur in rabbits with lesion in the liver.

At one time coccidia of domestic rabbits(Oryctolaguscuniculus) was thought to be similar to that of hares (Lepus species).However, after extensive studies, it was concluded thata majority of Eimeria species for domestic rabbits were host specific and could not be found in hares (Pellerdy, 1956).The species affecting rabbits are described below:

2.2 Etiology

2.2.1 EimeriaIntestinalis

Developmental stages occur in the small intestines. The oocysts of this species are pyriform in shape with a yellowish wall. Thefirst generations ofschozonts arefound in the epithelial cells of the distal portion of ofileum. Up to three generations of schizonts have been reported. The gametocytes are usually visible as early as 7-8 days after infection (Pellerdy, 1965).

2.2.2 EimeriaStiedae

The ellipsoidal oocysts in the species have a smooth and yellowish- orange wall .Excystation occurs in the small intestines were the sporozoites penetrate the mucosa and pass via hepatic-portal blood system to the liver and enter epithelial cells of bile ducts.Developemental stages are found here 5-6 days after infection.- Smetana (1933,a,b,c)

2.2.3 EimeriaCoecicola

This species affects rabbits in Hungary and Soviet Union. Asexual reproductive occurs in the epithelial cells of villi of the posterior small intestines .The gametogenous stage is found in the crypts of caecum. (Cheissin, 1947).The species has negligible pathogenicity and is considered synonymous with E.neoleporis (Pellerdy,1965).

2.2.4 Eimeria Magna

Oocysts are broadly ovoid .The developmental stages are in the jejunum and ileum.Oocyst wall is yellow to yellowish ï brown. Sporulation time is between 2-3 days.E. magna is considered a marked pathogen (Rutherford,1943).

2.2.5 EimeriaFlavescens

This species is regarded as pathogenic. (Marotel*et*Guilhon, 1941). The developmental stages are found in the caecum.E.flavescens is weakly immunogenic compared to E. intestinalis. (Norton *et al*.1979).

2.2.6 Other Species.

These include; E. exiguawhich is considered non pathogenic.E.irresiduaand E.piriformis are pathogenic (Yakimoff,1934).

2.2 Transmission and life cycle

Eimeria species have a direct life cycle. The life cycle in this parasites involves both asexual (merogony) and sexual (gamogony) reproduction(Muszynski.2011).The life cycle takes about 4-14 days to complete.It begins with ingestion of infective oocysts.Mechanical (contractions of upper intestinal tract) and enzymatic (pancreatic and biliary) enzymes weaken and digest the oocyst wall respectively. This leads to release of sporozoites which penetrate the epithelial cell lining the intestinal wall. Asexual reproduction or merogony occurs here giving rise to a greater number of merozoites.The number of merozoites depends on Eimeria species involved. The epithelial cells rapture and release mature merozoiteswhich infect new host cells. Merogony then repeats itself. The numbers of merozoite generations once again depend on species of Eimeria involved. The last generation of merozoites forms gametes. In gamogony majority form macrogametes which form the female cells involved in sexual reproduction. The rest form flagellated and mobile microgametes that form male cells of the sexual reproduction. Once the microgametes mature they leave the host cells and penetrate the host cells containing themacrogametes. Fertilization takes place and the result is a non-sporulated oocyst. The oocyst detaches and leaves the host.Sporogony occurs in the environment and the oocyst at this point is resistant to dessication.This is the infective stage waiting to be ingested and repeat the cycle.Coccidiosis is not considered a potential zoonosis.

2.3 Clinical presentation of the disease.

The disease is manifested by diarrhea and dehydration resulting from epithelial erosionHypoproteinaemia and anemia follow. Anemia is characterized by pale mucous membranes.Inappetance and depression can also occur. Inspection of fecal material may reveal blood. In young rabbits retarded growth occurs due to pathology in the liver and kidneys.

Retarded growth and emaciation are also caused by malabsorption of nutrients due to intestinal villusatrophy. Abdominalenlargement, increasedthirst does also occur due to hepatic coccidiosis.

2.4 Diagnostic procedures.

Diagnosis is usually difficult in asymptomatic animals. In symptomatic animals clinical signs such as diarrhea and weight loss are a pointer to the disease. Other clinical signs include enlarged abdomen and dehydration. Fecal samples can also be taken for floatation techniques where the number of oocysts per gram of feces is used to determine severity of infection. In hepatic coccidiosis an impression smear of the liver followed by direct microscopy can reveal the oocysts.Increased liver enzymes and bilirubin after biochemical tests may indicate hepatic coccidiosis.

2.5 Treatment and control

The most effective compounds for treatment are sulphonamides (Davies *et al,* 1963). Sulpaquinoxaline has been used but now resistance has been reported. It is administered in water or in feed. Sulfadimethoxine (0.5-0.7g/l drinking water) andsulfadimerazine (2g/l drinking water) are sulfa drugs used.Other coccidiostatsinclude Amprolium 9.6% in water and Salinomycin .Nitrfurans havebeen recommended for treatment of intestinal coccidiosis at a dose of 0.5-1g. per kg but are unsatisfactory for hepatic coccidiosis (Boch,1957). Toltrazuril and Diclazuriladministered for a minimum of five days and repeated after an interval of five days is the recommended treatment regime. Control is by improving hygiene in the rearing and breeding quarters.

MATERIALS AND METHODS

3.1Study area

The study was conducted from December 2014 to March 2015.Samples were collected from threerandomly selected Rabbit rearing establishments in the County of Nairobi. The sample processing and data recording was done at the University of Nairobi, Faculty of Veterinary Medicine at the Department of Veterinary Microbiology, Parasitology and Pathology. Some sample processing and data collection was done at the Veterinary Investigation and Research Laboratories in Kabete.

3.2 Study animals

Carcasses for postmortem were brought by farmers from Nairobi and surrounding areas for the purposes of establishing cause of death. Only carcasses from Nairobi County were included in the study. A total of Eight (8) rabbit carcasses for postmortem were entered for this study. Both males and females of different ages were included.

3.3.1Sample processing.

Sixty fecal samples were collected. In the laboratories, samples were each emulsified in water and sieved and concentrated by floatation technique before being used to charge the Macmaster chamber which was examined under a microscope at low power magnification. Positive samples were put into age-groups using bio data available. For the carcasses, postmortem was done by first examining the external appearance and general body condition. This was followed by skinning and opening into abdominal and thoracic cavities. The organs were observed in ï situ before being removed. .The intestines were incised along the anti-mesenteric border and mucosa observed. Samplesweretaken from intestinal contents for microscopy and bacteriology. Samples were also taken from the liver (bile duct contents). Intestinal scrapings were also stained with haematoxylin and eosin for microscopy so as to identify developemental stages of coccidia.

CHAPTER FOUR: RESULTS

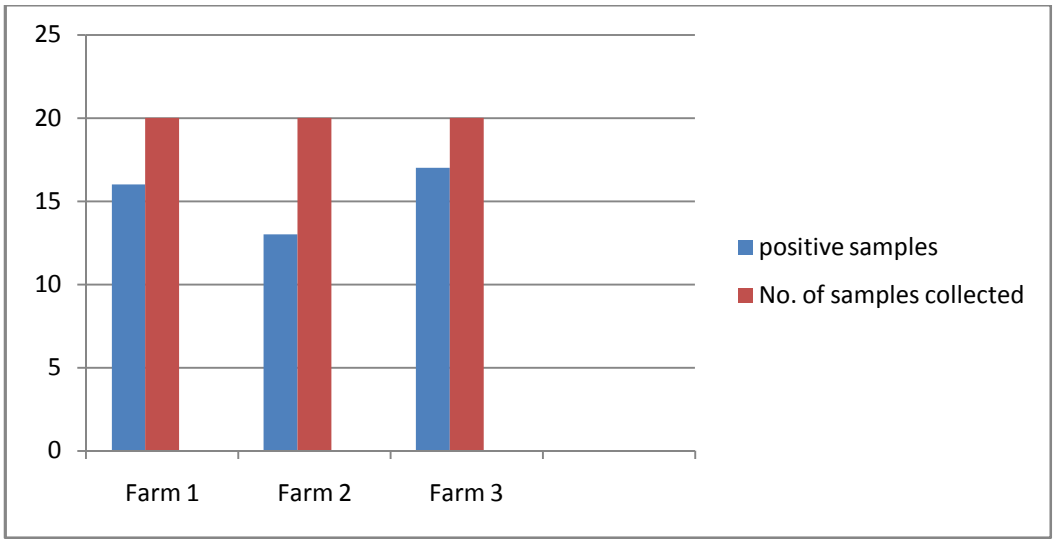
Table 1 below shows results of fecal sample analysis.

FARM	NUMBER OF SAMPLES.	NO. OF POSITIVE SAMPLES	NO.OF NEGATIVE SAMPLES	PERCENTAGE POSITIVE.
Farm. 1	20	16	4	80%
Farm. 2	20	13	7	65%
Farm.3	20	17	3	85%
Totals	60	46	14	76% (average percentage).

Average percentage positive= 85+65+80=230/3

=76.7% which was also taken to be the prevalence rate

Figure 1.Positive samples from each Farm



The fewer positive samples in farm two reflect the better husbandry in the farm which was an institutional farm.

Table 2.Number of oocysts/gram in each age group

Age in months	1-4	5-8	9-12	13-16	17-20
Average no of oocysts/gram of feces	400	350	223	180	150
No. of rabbits.	15	13	11	4	3

Figure 2: Relationship of coccidian oocyst count with age

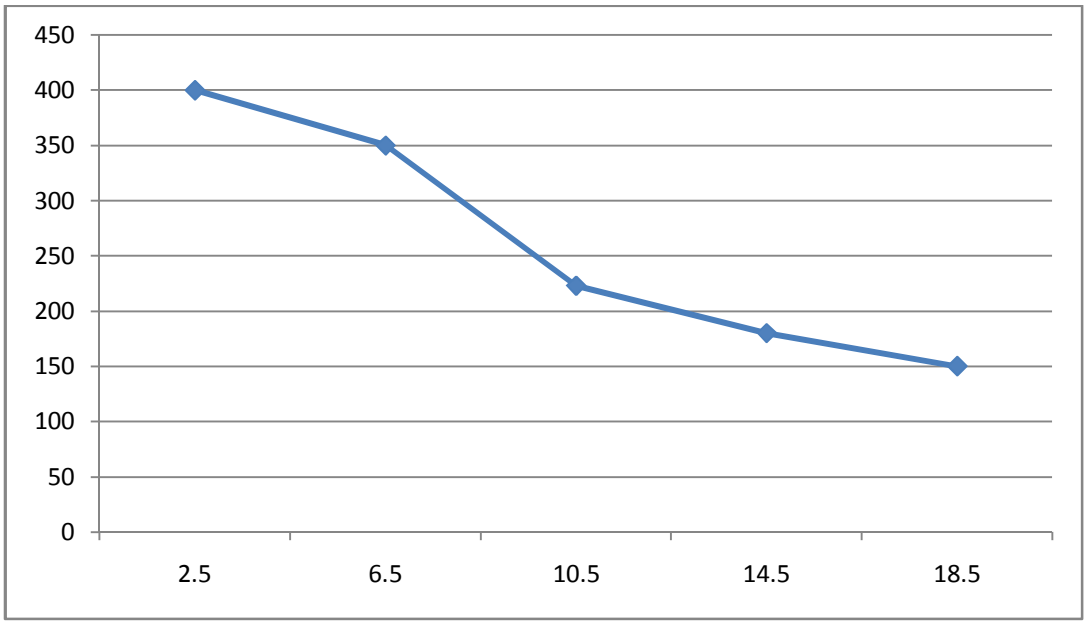


Table 3 Postmortem findings.

MAJOR LESIONS	NO	AGE	Percentage (%)
Carcasses with hepatic lesions	1	3yrs.	12.5
Carcasses with intestinal lesions	**7**	**2months-2** **3months-3** **4months-2**	**87.5**

These results were based in identification of developmental stages in intestinal epithelium. For hepatic coccidiosis, was based on oocyst count from bile contents and necrotic lesions in the liver,

DISCUSSION.

According to the study intestinal form of coccidiosis was more prevalent and young rabbits especially weaners who are more susceptible as they accounted for a mortality of 87.5%.Coccidiosis was found to be very prevalent in the county with a prevalence rate of 76.67%.Most of the animals were however asymptomatic. The carcass with hepatic lesions belonged to the Animal production unit at the U.O.N. Apart from frequent urination and thirst, lameness was listed as part of clinical history. Lameness might have stressed the animal exposing it to chronic hepatic coccidiosis. Hepatic coccidiosis is less prevalent compared to intestinal form. According to this study the intestinal form was more prevalent at 87.5% compared to hepatic form at 12.5%.Developemental stages (merozoites) were seen in intestinal epithelium. In other studies housing of rabbits of different ages and failure to control other concurrent infections has been pointed out as a major predisposing factor (Okumu*et al,*2014).This has a bearing on control of ecto-parasites, ease of cleaning and avoiding injuries to the rabbits. Poor hygiene has also been identified as a major factor predisposing rabbits to coccidiosis. Infections also increase in the rainy season. (Gill and Ray, 196o).

5.1 LIMITATIONS.

Only 3 farms in different parts of the county were included in the study. This therefore is not sufficient representative sample.

CONCLUSSIONAND RECOMMENDATIONS

The investigation revealed a high prevalence of coccidiosis in the study area. This has a negative influence on production parameters such as weight gain in rearing establishments and age of puberty in breeding establishments. In order to curb this high prevalence, the study recommends that researchers and animal health providers should begin giving more attention to Rabbit diseases among them coccidiosis.Rabbit farmers should also be provided with extension services to improve rabbit husbandry.In large establishments, regular fecal sampling for coccidian oocyst counts is a valuable check on status of the infection.

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