COCCIDIOSIS IN RABBITS

By

J. P. ADUMA
Department of Animal Science
Egerton College
P.O. Private Bag
NJORO, KENYA.

SUMMARY

A study made over a period of two months in a group of New Zealand white rabbits and later observations at the Egerton College rabbitary showed that the clinico-pathological features of various species of Eimeria can be very much reduced if certain management practices are observed and strictly adhered to. These included (1) Proper construction of cages and pens, (2) Avoidance of overcrowding in the pens, (3) Frequent clearing of pens and cages, (4) Good nutrition and (5) Frequent application of coccidiostats such as Neomycin, Tetracyclines, Amprolium and Sulfaquinoxalline. By maintaining a high sanitary standards, the life cycle of the parasite was either broken or the number of oocysts sporulating greatly reduced; thus allowing for a build up of immunity.

INTRODUCTION

Rabbit keeping can both be a paying hobby and also a means of converting waste feed and surplus garden produce into edible meat and other by-products of rabbitry. On that account maintenance of good health should be one of the management aspects in rabbit production if the enterprise is to be economic.

One of the diseases that the rabbit raiser has to contend with is coccidiosis. This disease may at times cause serious illness and even death especially amongst young rabbits in intensive breeding establishments. The literature on the pathology of rabbit coccidiosis is limited. Several authors have noted that coccidia tend to be host specific and also site specific within the normal host and that sanitation plays a very big role in the occurrence or non occurrence of rabbit coccidiosis.

This paper describes observations on the symptoms and pathology of the disease at the Egerton College rabbitry and measures which have been taken to minimise its occurrence.

LIFE CYCLE OF THE PARASITE

Two forms of coccidiosis are recognised in the rabbit. One is the Intestinal coccidiosis caused by several species of Eimeria of which E. irresidua, E. Perforans and E. magna are some of the important respresentative species. The other is the Hepatic coccidiosis caused by Eimeria stiedae.

Rutherford (1943) and Smetana (1933) all observed the protozoa to be parasitic in epithelial cells during endogenous stage of life cycle. The life cycle involved a period of asexual development (schizogony), followed by sexual development (gametogony).

During schizogony succeeding generations of schizonts are formed and contain invasive particles called merozoites. These eventually form gametocytes which now undergo fertilisation to produce a zygote. The fertilized zygote becomes encased within a resistant wall - called oocyst. It is the oocysts which are passed out of the host faeces; and once outside the host, they undergo exogenous development (sporogony) culminating in the formation of infective forms called sporozoites. This development outside the host only occurs if conditions are favourable (warmth and moistness). Infection occurs as a result of ingestion of the sporulated oocyst. Once inside the host, the sporozoites penetrate the intestinal mucosa to reside in the intestinal epithelium and sub-mucosal tissues (for intestinal coccodiosis). For Eimeria stiedae (liver coccidiosis), excystation occurs in the small intestine and the sporozoites penetrate the intestinal mucosa and pass via hepatic-portal blood system to the liver where they reside in the epithelium of the bile ducts.

MATERIALS, METHODS AND RESULT OF A STUDY COCCIDIOSIS

At Egerton College Rabbitry where a study was conducted by the author during the period September 1976 to December 1976, it was noticed that following ingestion of viable infective oocysts (using disposable syringe and oocysts reconstituted in saline) or following unsanitary conditions in the pens which allowed for rapid sporulation, young rabbits developed symptoms within two to three weeks. The animals lost appetite, progressively became weak and started to diarrhea. The diarrhea was catarrhal to mucoid but non-hemorrhagic. Later on the abdomen distended due to ascites and the liver could be palpated as an enlarged organ. In some cases death occured without any premonitory symptoms.

On post-mortem, the carcasses were found to be emaciated and the perineum soiled with faeces. Pathological lesions were confined mainly to the intestines and the liver.

In the intestines there was in most cases marked enlargement and thickening of the intestines. In some cases the intestines were just dilated and gas filled. There were white-grayish areas in the intestinal mucosa and in the lumen was an exudate which in some cases was catarrhal and in others mucoid. In one case seen in July 1977, there was petechial hemorrhages on the mucosal lining of the intestines (The author thought that this could possibly have been a case of Eimeria perforans but it was not confirmed). In the cases of Eimeria stiedae (liver coccidiosis), the liver was enlarged probably as a result of proliferation of bile duct epithelium. Pus-like material could be seen in the bile ducts. On the liver surface there were numerous white raised or flat lesions which ranged from 2mm. to 5mm. in diameter. The lesions on cutting revealed thick white-yellow fluid.(see table 1).

In an attempt to study an effective drug for the control of Rabbit coccidiosis, the author divided 30 rabbits aged between four and a half and five weeks into six groups named A, B, C, D, E, F, . . Each group was subjected to a different drug as shown in Table I & II with group C being control. The results of this study showed that if rabbits were given prophylactic dosages of drugs like NeoTerramycin (Neomycin plus oxytetracycline). Amprolium and Neomycin, the incidence was greatly reduced. Not only was the incidence lowered but in some antibiotics average weight gain per week was significant (See Table III).

When pens were left uncleaned for a period of 1 week plus, the rabbits later started to develop symptoms. However if cleaning was regular and cages kept high up, faecal oocyst count went considerably down. A liver oocyst count conducted at the end of the trial showed considerably low figures for the various (McMaster) groups of rabbits on different drugs (Table IV). It should be mentioned that the rabbits throughout the trial never had access to pellets as these were supposed to contain coccidiostats. They were fed mainly on maize meal, wheat meal, green lucerne, vegetables and hay. Thus there was insufficient supply of protein supplement and this may have been responsible for the low weight gain shown. In another trial by the author (March to July 1978 - unpublished) it was shown that sulfaquinoxaline given in the drinking water at a concentration of 0.025% very greatly reduced the incidence of coccidiosis.

T A B L E I

Liver Post-Mortem Results

Group	Drug	Observations
A	NeoTerramycin	Liver enlarged. Six white yellow lesions sized 2mm - 3mm in diameter, lesions revealed thick white-yellow fluid.
B	Amprolium	Liver of normal size. No hepatitis.
C	(Control)	Liver enlarged. Very many large white-yellow lesions sized 3-5mm in diameter. Bile ducts enlarged. Some degree of hepatitis.
D	Neomycin	Liver of normal size. Six white lesions. Slight hepatitis.
E	Terramycin	Liver of normal size. Six white lesions. Slight hepatitis.
F	Nitrofurazone	Liver enlarged. White lesions. Slight hepatitis.

TABLE II

Rabbits, Drugs, Dosage and Route

Group	No. of Rabbits	Drugs	Dosage	Route
A	4	NeoTerramycin	14 mg/kg. bodyweight	Oral
B	4	Amprolium	50 mg/kg	Oral
C	6	Not applicable (control)	Not applicable	Not applicable
D	5	Neomycin	20 mg/kg.	Oral
E	5	Terramycin	40 mg/kg.	Oral
F	5	Nitrofurazone	6 mg/kg.	Oral

TABLE III

Average Weekly Weight Gain

Group	Drug Used	Average Weight Gain
A	Neoterramycin	0.19 kg.
B	Amprolium	0.11 kg.
C	Control	0.15 kg.
D	Neomycin	0.12 kg.
E	Terramycin	0.17 kg.
F	Nitrofurazone	0.14 kg.

TABLE IV

Liver Oocyst Count

Group	Drug	Oocyst per gm. of liver
A	NeoTerramycin	1000
B	Amprolium	380
C	(Control)	5080
D	Neomycin	740
E	Terramycin	1700
F	Nitrofurazone	3060

DISCUSSION AND CONCLUSIONS

From the results of the trials and later observations it was evident that hygiene plays a big role in the occurrence or non-occurrence of coccidiosis. By frequently changing the beddings and properly cleaning the pens, the oocysts were not given a chance to sporulate and become infective. Proper feeding and watering was essential if the animals have to be in good state to be able to resist infections. By combining high sanitation with high feeding as well as application of coccidiostats the rabbits then are able to only ingest low infective doses of oocyst and subsequently develop coccidiasis(immunity). This can be seen from the liver lesions. It is significant that these animals never later on showed clinical coccidiosis and the likely reason as explained above is that they later on became immune as a result of previous exposure to low levels of oocysts and frequent use of coccidiostats. The most critical age appears to be in the four weeks. Therefore it was proper that high management be maintained from the start.

Apparently there seems to be little or no differences in breed susceptibility. All breeds seem to go down with the disease. It is therefore important that whatever the breed, age or sex high hygiene and proper housing is essential to make rabbit keeping commercially viable.

A C K N O W L E D G E M E N T

I wish to express my gratitude to employees of Tatton Farm, Egerton College, who work in Rabbit Section for helping with the care and feeding of the rabbits.

R E F E R E N C E S

ADUMA, J. P. - PROPHYLACTIC CONTROL OF RABBIT COCCIDIOSIS IN NEW ZEALAND WHITE. Egerton College Agric. Bull. Vol. 1 No. 1.

HORTON-SMITH, C. - TREATMENT OF HEPATIC COCCIDIOSIS IN RABBITS. Journal. Comp. Path. 69, 192-207.

RUTHERFORD - THE LIFE CYCLE OF FOUR INTESTINAL COCCIDIA OF THE DOMESTIC RABBIT. Journal of Parasitology, 29, 10-32.

SMETANA, H. - COCCIDIOSIS OF THE LIVER OF RABBITS. Arch. Path., 15, 175-192.

* * * * * * * * * * * *