

Coccidiosis in rabbits in a subtropical hilly region

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Received: 05-11-2013

Accepted: 14-10-2014

DOI:10.5958/0976-0555.2015.00064.3

ABSTRACT

A detailed study on rabbit coccidiosis in a subtropical hilly region of India regarding prevalence, intensity of infections, species involved and control measures adopted during mortality in a rabbit farm due to coccidiosis, was undertaken for awareness of the rabbit owners of the hilly region. Overall 57.28% rabbits were found positive for coccidial infections. Mortality in rabbit was diagnosed due to coccidiosis. Six species of *Eimeria* were identified i.e. *E. magna*, *E. exigua*, *E. piriformis*, *E. coecicola*, *E. intestinalis* and *E. media* and thus intestinal coccidiosis were found responsible for such mortality. Treatment with oral administration of amprolium soluble powder 20% w/w @1g/ litre of drinking water for 10 days was found to be effective to control the mortality while individual treatment was found effective to control mortality rather than group treatments. A correlation between occurrences of coccidiosis with meteorological parameters was also established. It has been concluded from this study that pathogenesis of species of *Eimeria* and effectiveness of medicine are region specific. Only intestinal coccidiosis could be able to cause mortality in rabbit without involvement of the hepatic coccidiosis. The rainy season particularly the month of August was very much susceptible for coccidial infection in subtropical hilly region.

Key words: *Eimeria*, Rabbit, Species, Subtropical, Treatment.

INTRODUCTION

Rearing of rabbits in the hilly region may be taken as an alternative source for production of meat. Rabbits have the good ability to convert roughages into meat and that may be exploited to meet out the gap between supply and demand of meat for human consumption. But one of the main constraints to flourish the rabbit industry is the mortality of rabbits due to coccidiosis, a gastrointestinal protozoal disease of rabbits. Two forms of the disease have been found to occur, intestinal coccidiosis and hepatic coccidiosis, caused by different species of the protozoa of *Eimeria* (Bhat *et al.*, 1996). A detailed study on rabbit coccidiosis in a subtropical hilly region of India regarding prevalence, frequency of infections, correlation of infections with meteorological parameters, species identification and control measures adopted during mortality due to coccidiosis in a rabbit farm is being reported for awareness of the rabbit owners of the region as such type of detailed report from this region are not available.

MATERIALS AND METHODS

A total of 496 faecal samples of New Zealand White rabbits, aged between 2 to 5 months, suspected for coccidiosis were collected for a period of 12 months from rabbit farm of ICAR Research Complex for North Eastern Hill Region, Umiam, Meghalaya, started from April, 2010 to March, 2011.

The farm is situated at an altitude of about 900 m above mean sea level where average monthly minimum and maximum temperatures were observed as 5.1°C and 29.4°C, respectively, during the study period. The average monthly relative humidity prevailed during the study period were recorded as 67.3% (minimum) to 89.4% (maximum) with average monthly total rain fall ranged between 1.6 mm to 719.7 mm. The collected faecal samples were triturated to make suspension, then strained and used for identification of infection as well as estimation of oocysts per gram (OPG) of faeces as per standard method. From a portion of faecal suspension, oocysts were separated using floatation technique and separated oocysts were put into 2.5% (w/v) potassium dichromate for sporulation of oocysts and kept at 28°C in a B.O.D. incubator for 7 days. The shape, size and sporulation times were taken into consideration for identification of oocysts. Rabbits, which died during the study period, were subjected to post mortem examination. Faecal materials were also collected from these dead rabbits during post mortem and processed for estimation of oocysts per gram (OPG) of faeces and identification of oocysts, as mentioned above.

RESULTS AND DISCUSSION

Overall 57.28% rabbits were found positive for coccidial infections. Month wise prevalence and OPG has

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been depicted in Table 1. The correlation between meteorological data, percentage of infection and oocyst per gram of faeces has been presented in Fig.1. It could be observed from the table and figure that infection was persisted throughout the year. The minimum infection and minimum OPG were observed during the month of January and maximum during the month of August. Coccidiosis of rabbit is such an infection that are always present in rabbit farms, as they are almost impossible to eradicate (Vancraeynest *et al.*, 2008) and for this reason throughout the year the infection was found to present in this farm even in lower OPG. There is a trend of increase rate of infection started from the month of June and July that reached up to August i.e. during rainy season, might be due to presence of increase humidity, rainfall and optimum temperature, favouring the sporulation of oocysts and thereby increased the chances to get infection. Similar infection has been reported in the month of May and continued till August on a high level (Nosal *et al.*, 2006), supported the present findings of trend of infection as well as maximum infection during the month of August.

During the month of August, a sudden rise of OPG was noticed and mortality in 13 young rabbits happened

TABLE 1: Prevalence of coccidiosis in rabbits with OPG

Month/Year	Percent Positive	Mean OPG
April' 10	56.6	1300
May' 10	60.0	950
June' 10	56.3	1100
July' 10	66.6	3200
August' 10	87.6	50,000
September' 10	49.0	4750
October' 10	40.47	3230
November' 10	32.5	2500
December' 10	20.0	800
January' 11	16.6	150
February' 11	81.81	2510
March' 11	66.66	650

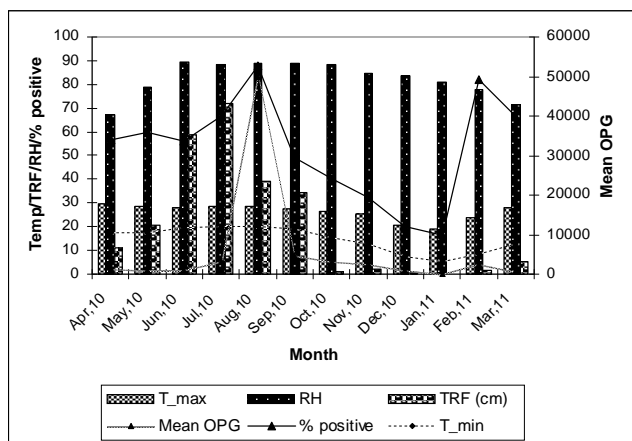


FIG 1: Correlation of meteorological data with monthly prevalence and mean OPG counts in New Zealand White rabbits

with clinical symptoms of diarrhea and emaciation within a period of 10 days. Six different species of *Eimeria* were identified i.e. *E. magna*, *E. exigua*, *E. piriformis*, *E. coecicola*, *E. intestinalis* and *E. media* (Fig. 2), after culture of faecal materials of dead rabbits. These six different species of *Eimeria* were also identified in the faecal samples collected from other live rabbits. During post mortem, accumulation of gas in the intestine, inflammation, ulceration and erosion of intestinal epithelium was noticed. No lesions were observed in liver and there were no distended or enlarged liver, bile duct or gall bladder. No white spots were found on the surface of the liver. These findings of post mortem along with identification of oocysts confirmed that death of rabbits happened due to intestinal coccidiosis without involvement of liver i.e. *E. stiedai*, considered as potentially pathogenic for hepatitis. Although there was a sudden increase of percentage of infection during the month of February, but OPG count was comparatively less in that month. In this study it has been observed that an OPG count of 50,000 contributed by various species of intestinal coccidia could able to cause the death of rabbits, whereas in another study, no clinical symptoms except diarrhea, in rabbits suffered from OPG count of even 6,13,017 and could not able to cause the death of the rabbits, in spite of involvement of *E. stiedai* has been observed (Laha *et al.* 1999). This signified that the species present in this subtropical hilly area were more pathogenic and thus pathogenicity of coccidia was region specific. From India, Jitherdran and Bhat (1995) reported the incidence of rabbit coccidiosis as 57.3% in Kangra Valley of Himachal Pradesh with identification of eight different species but without the prevalence of *E. exigua*. Shameem and Devada (2005) reported 18.54% infection in New Zealand White

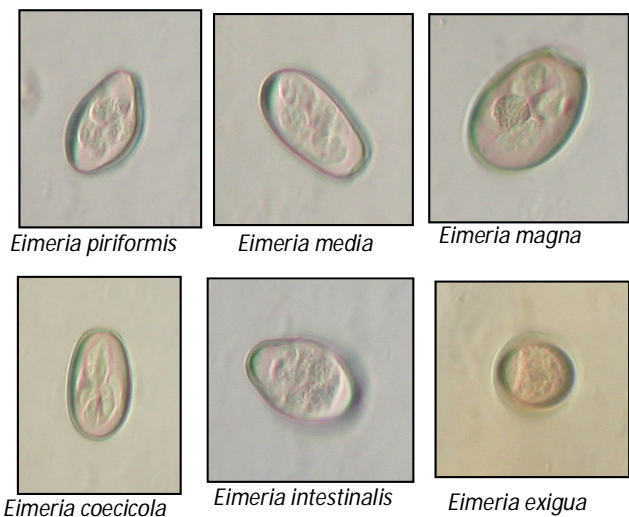


FIG 2: Microphotograph of sporulated oocysts of the six species of *Eimeria* collected from naturally infected New Zealand White rabbits

rabbits. They identified six different species and observed more infection during rainy season as observed in the present study. In controlled conditions, the optimum temperature for sporulation of rabbit coccidia is 27°C and the sporulation temperature must not exceed 28°C. In this study, high humidity were present throughout the year and environmental temperature suitable for sporulation (with negligible increase than controlled conditioned) were very much present, from the month of May to September. Identification of six different species of *Eimeria* with 31.0% infection in wild rabbits has been reported by Razavi *et al.* (2010) from Iran. El-Shahawi *et al.* (2012) identified eight different species of *Eimeria* and reported high prevalence (70%) of rabbit coccidia in domestic rabbits from Egypt. In farm condition 41.7 % coccidian infections in rabbits with involvement of six different species have been reported from Taiwan (Ming-Hsien *et al.*, 2010).

In the present study it has been observed that amprolium (hydrochloride) soluble powder 20% w/w @ 1g/ litre of water for 10 days was effective to control the mortality, which again contradicts the findings of Laha *et al.* (1999) and other workers who reported that amprolium is not always effective in the control of coccidian infection in rabbits. This observation infers to conclude that the efficacy of amprolium is also region specific that may be due to non-development of resistance against amprolium in this particular region. A

particular strength of anticoccidial agents either feed or drinking water are generally used on herd basis for control of coccidiosis. It was found individual drenching during high prevalence was better to control mortality in comparison to herd treatment. Sulphadimidine has been used successfully to control coccidial infection in rabbits and has been found most effective anticoccidial agent (Laha *et al.*, 1999; Shameem and Devada, 2010).

From the present study it can be concluded that pathogenesis of species of *Eimeria* and effectiveness of medicines are region specific. Only intestinal coccidiosis could able to cause mortality in rabbit without involvement of the hepatic coccidiosis. The rainy season particularly the month of August is very much susceptible for coccidian infection in subtropical hilly region. Individual treatment was found effective to control mortality rather than group treatments.

ACKNOWLEDGEMENTS

We are thankful to Indian Council of Agricultural Research, New Delhi to carry out this research work under 'All India Network Programme on Gastrointestinal Parasitism'. The facilities provided by Director, ICAR Research Complex for NEH Region, Umiam, Meghalaya, India, are thankfully acknowledged.

REFERENCES

- Bhat, T.K., Jithendran, K.P. and Kurade, N.P. (1996). Rabbit coccidiosis and its control: a review. *World Rabbit Science*, **4** : 37-41.
- El-Shahawi, G.A., El-Fayomi, H.M. and Abdel-Haleem, H.M. (2012). Coccidiosis of domestic rabbits (*Oryctolagus cuniculus*) in Egypt : light microscopy study. *Parasitol. Res.*, **110**: 251-258.
- Jithendran, K.P. and Bhat, T.K. (1995). Subclinical coccidiosis in angora rabbits, a field survey in Himachal Pradesh, India. *World Rabbit Science*, **4** : 29-32.
- Laha, R., Hemaprasanth, Dey, A. and Harbola, P.C. (1999). Comparative efficacy of sulphadimidine and combination of Amprolium, sulphaquinoxaline in the control of natural coccidial infection in rabbits. *Indian Vet. J.*, **76** : 1013-1015.
- Ming-Hsien, L., Hai-I, H. and Hong-Kean, O. (2010). Prevalence, infectivity and oocyst sporulation time of rabbit coccidian in Taiwan. *Trop. Biomed.*, **27** : 424-429.
- Nosal, P., Petryszak, A., Nowosad, B. and Sobolewska, M. (2006). Gastrointestinal parasites of rabbits in coproscopic investigations. *Wiad. Parazytol.*, **52** : 327-330.
- Razavi, S.M., Oryan, A., Rakshandehroo, E., Moshiri, A. and Mootabi Alavi, A. (2010). *Eimeria* species in wild rabbits (*Oryctolagus cuniculus*) in Fars province, Iran. *Trop. Biomed.*, **27** : 470-475.
- Shameem, H. and Devada, K. (2010). Comparative chemotherapeutic studies to control coccidiosis in rabbits. *J. Vet. Parasitol.*, **24** : 91-92.
- Shameem, H. and Devada, K. (2005). Prevalence of rabbit coccidiosis in Thrissur. *J. Vet. Parasitol.*, **19** : 77-78.
- Vancraeynest, D., De Gussem, M., Marien, M. and Maertens, L. (2008). The anticoccidial efficacy of robenidine hydrochloride in *Eimeria* challenged rabbits. Pathology and hygiene, 9th World Rabbit Congress, Verona, Italy : 1103-1106.