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# Epidemiology of Coccidial Infections in Goats in and around Jabalpur, India

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**Abstract** Study on epidemiology of coccidial infections in goats was conducted during November 2012 to October 2015. Examination of 2441 faecal samples of goats revealed 1896 samples positive for Eimeria species with overall prevalence of 77.67%. Year wise prevalence revealed a decreasing trens in prevalence rate of *Eimeria* spp. and effect of year on prevalence was highly significant. Significantly higher coccidial infections were observed in winter (86.21%) season as compared to summer (77.43%) and monsoon (72.57%). Age wise prevalence revealed that the *Eimeria* spp. infection was slightly higher in adults (77.96%) than in kids (76.19%). However, the difference in prevalence was not statistically significant.

**Keywords** Eimeria, Goats, India, Prevalence.

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## Introduction

Coccidiosis is a widespread disease caused by protozoan parasites belonging to the Eimeria genus and which affect a variety of animal including small ruminants. The disease condition results in heavy losses in goats in the form of diarrhoea, poor weight gain, lowred productivity, morbidity and mortality. Clinical coccidiosis of goats occurs mainly in young goats and has a higher prevalence under conditions of intensive husbandry. The disease may occur under stress factors such as weaning dietary changes, inclement weather, or travel and regrouping. Oocysts are the infective form eliminated in the faeces and transmission occurs directly by ingestion, so infection is higher in specific conditions regarding environment, management and animal immunity [1]. In India, outbreaks of coccidiosis and prevalence across the country were well documented as climatic conditions are most conductive for sporulation and survival of coccidian oocysts throughout the year [2, 3]. Although several studies in Madhya Pradesh (MP) have been done on prevalence of gastrointestinal parasites including Eimeria species in goats [4, 5] but studies on epidemiology of coccidia of goats are lacking. The present investigation was planned with the objective of understanding the epidemiology of coccidia infection in goats in MP.

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## Materials and Methods

The fecal samples of goats were collected from Ghana, Panagar, Ramnagra and Temarbhita villages as well as from Adhartal and Amanala goat farms. The period of study was divided into three years viz. first year (Nov 2012 to Oct 2013), second year (Nov 2013 to Oct 2014) and third year (Nov 2014 to Oct 2015) and every year was further divided into three seasons viz. winter (Nov – Feb, summer (March – June) and monsoon (July – October). Jabalpur is located in Agro – climatic Zone III (i.e. Kymore Plateau & Satpura Hills) of the state of Madhya Pradesh. Jabalpur has a humid subtropical climatic typical of North-central India (Madhya Pradesh and Southetn Uttar Pradesh). Meteorological information on minimum and maximum temperature ($^0$C), relative humidity (%) and rainfall (mm) were collected from the Agro-meteorology, Department of Physics, College of Agricultural Engineering, JNKVV, Jabalpur. The maximum temperature varies from 21.2$^0$ to 42.7$^0$C and minimum 6.6$^0$ to 26.8$^0$C. The maximum rlative humidity varies from 35-95% and minimum 12-82% with an average annual rainfall of 1619.54 mm. Goats were divided into two groups according to their age as kids (6 months - 1 year) and adults (>1 year). Faecal samples of 2441 goats were collected in polythene bags labeled with name of owner, age and identification number. Parasitological investigation was done by microscopic examination of samples by floatation technique using saturated salt solution [6]. Chi-square test was used for analyzing the data. Ap value of <0.01 was considered significant [7].

## Results and Discussion

Out of the total 2,441 goats examined, 1,896 (77.67%) were positive for *Eimeria* spp. Singh et al. [5] observed higher prevalence of coccidia (82.4%) from districts other than Jabalpur. However, Gupta et al. [4] reported comparatively lower prevalence of *Eimeria* spp. (45.38%) in goats of Jabalpur district. This variation in prevalence may be due to variation in sample size in different studies. Radfar et al. [8] found 89.27% goats positive for coccidial oocyst in Iran. Year wise prevalence at Jabalpur revealed that a decreasing trend was observed in overall prevalence rate of *Eimeria* spp. Prevalence of *Eimeria* spp. in the first,second and third year was 92.18% , 83.39% and 69.27% respectively (Table 1). The effect of year on prevalence was highly significant ($p$<0.01). The decreasing trend may be due to increased awareness of farmers and improved veterinary services by field veterinarians in and around Jabalpur. Significantly higher ($p$<0.01) coccidial infection were observed in winter (86.21%) season as compared to summer (77.43%) and monsoon (72.57%), (Table 1). The prevalence of coccidia was highest druing winter because the flock was bing kept more compact. Radfar et al. [8] also found highest OPG in winter. Sahay et al.[9] also reported highest incidence of parasites in goats during winter in West Bengal, India. Age wise prevalence revealed that the *Eimeria* spp. infection was slightly higher in adults (77.96%) than in kids (76.19%), (Table 1). However, the differenc in prevalence was not statistically significant ($p$>0.01). Anene et al. [10] also reported higher prevalence in adults as compared to kids in Nigeria. However, it is also reported that coccidial infections were almost equal in yound and adult goats [5]. On the contrary, Faizal and Rajapakse [11] noticed higher incidence in kids in the dry areas of Sri Lanka.

**Table 1.** Coccidial infections in goats in Jabalpur from November 2012 to October 2015. Figures in parentheses indicate percentage, **X2 values were considered significant at $p$ <0.01 level.

| Factor | Level | Examined | Prevalence (%) | Degree of freedom | $X^2$ Value |
|---|---|---|---|---|---|
| Year | First | 550 | 507 (92.18) | 2 | 131.50** |
| | Second | 560 | 467 (83.39) | | |
| | Third | 1331 | 922 (69.27) | | |
| Season | Winter | 609 | 525 (86.21) | 2 | 40.28** |
| | Summer | 855 | 662 (77.43) | | |
| | Monsoon | 977 | 709 (72.57) | | |
| Age | Kids | 399 | 304 (76.19) | 1 | 0.60 |
| | Adults | 2042 | 1592 (77.96) | | |

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