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Research Article

PREVALENCE OF *BALANTIDIUM COLI* INFECTION IN DAIRY ANIMALS OF SEMI-ARID EASTERN PLAINS OF RAJASTHAN

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ABSTRACT

A total of 649 faecal samples comprising of 392 samples from cattle (215; native and 177; crossbred) and 257 from buffaloes were collected randomly from dairy animals of four districts of Rajasthan during summer, rainy and winter season from March 2016 to January 2017 and were screened for presence of *Balantidium coli*. An overall low grade infection (1.08%) having non-significant variation among different seasons, breeds and districts was recorded. Infection was higher in native cattle (2.32%) as compared to crossbred cattle (1.13%) whereas, *B. coli* infection was not recorded from buffaloes. Seasonal analysis revealed highest prevalence of *B. coli* in rainy season (1.50%), followed by winter (1.44%). District-wise prevalence revealed the highest prevalence of *B. coli* infection in Tonk district (2.48%) followed by Ajmer (1.09%) and Jaipur district (0.62%).

Key words: *Balantidium*, Cattle, Rajasthan, Ruminants, Agro-climatic zones

Balantidiosis caused by *Balantidium coli*, is a common disease of ruminants *viz*. cattle, buffaloes, sheep and goats but may also be present in pig, monkey, chimpanzee, orangutan, guinea pig and man (Rahman, 1985; Levine, 1985). Bovines are important contributor to the national economy and trade of India. Parasitic infections are major constrain and cause nearly one-third of total losses due to all animal diseases (Anon, 1990). Among the protozoan diseases, *Balantidium* is an often-neglected pathogen which naturally inhabitates in the caecum, colon and rectum of apparently healthy animals, but under certain circumstances it causes clinical disease Bovines may harbor subclinical infection of *B. coli* that often remain unnoticed and may lead to the overlooked production losses due to which the organism in recent times may be regarded as an emerging protozoan pathogen (Schuster and Ramirez, 2008). *B. coli* fundamentally affect the colon and causes clinical manifestation from asymptomatic to serious dysenteric forms (Lazar *et al.,* 2004). It has cosmopolitan distribution and is a zoonotic disease. Though *B. coli* infection is considered to be prevalent in tropical and subtropical countries of the world (Bauri *et al.*, 2012), limited studies regarding the prevalence of the disease has been carried out globally (Hussanjak *et al.*, 1997; Tarrar *et al.*, 2008; Bilal *et al.,* 2009; Roy *et al.*, 2011). As regards the Indian scenario, some reports of balantidiosis in bovines have been reported (Niphadkar and Raote, 1994; Palanivel *et al.*, 2005; Sreedevi, 2012; Sudan *et al.*, 2012; Gupta *et al.,* 2014). There seems to be the paucity of reports on presence of this disease in Rajasthan state (Godara and Manohar, 2004; Choubisa and Jaroli, 2013), no comprehensive data is available on the prevalence of balantidial infection yet. The present study was, therefore, planned to map the prevalence of *B. coli* infection of dairy animals in semi-arid eastern plains of Rajasthan.

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MATERIALS AND METHODS

Study Area: Rajasthan state is located at 27.0238° North latitude, 74.2179° East longitude and 309 m above the sea level on the western side of the country. Being the largest geographical state, it is divided into ten agro-climatic zones and the study was conducted in semi-arid eastern plain zone of Rajasthan. The annual rainfall of the region varies from 313 to 694 mm with an increasing trend towards the east. Summer and winter temperatures are not as extreme as in the arid west but the summer temperature may reach around 47°C and in the winter, it is up to 5°C. Dairy animals were examined from four districts of semi-arid eastern plain zone of Rajasthan *viz.* Ajmer, Jaipur and Tonk districts and Bandikui, Dausa, Lalsot, and Sikrai blocks of Dausa district.

Collection of Samples: A total of 649 faecal samples of dairy animals comprising of native cows (215), crossbred (177) and buffaloes (257) were collected randomly from the four districts of semi-arid eastern plains of Rajasthan during summer, rainy and winter

seasons from March 2016 to January 2017. The samples were collected in sterile polythene bags and labeled carefully indicating the host's detail, location and month of collection, kept in a cool transport box and brought to laboratory for further examination.

Coprological Examination: The faecal samples were examined qualitatively by standard direct smear method as well as sedimentation technique for the detection of parasitic stages of *B. coli*. The parasites were identified on the basis of morphological features of cyst and trophozoite as described by Soulsby (1982). Standard Stoll's technique was used to quantify the infection and calculate cysts per gram (CPG) of faeces (Soulsby, 1982).

Statistical Analysis: All data analyses were performed by using statistical software program (SPSS for Windows, Version 20.0, USA). Association between the prevalence of B. coli infection with various factors (season, district and animal type) was carried out by Chi square test.

RESULTS AND DISCUSSION

Trophozoite and cystic stages of the parasite were encountered on microscopic examination. The trophozoite showed a sausage shaped macronucleus and a rounded micronucleus. The body surface of trophozoite was covered with slightly oblique longitudinal rows of cilia (Fig. 2). The cysts were spherical or slightly ovoid, yellowish-green, double walled with kidney shaped macronucleus being visible during examination (Fig. 1). The morphology of the parasitic stages observed was in congruous with that as reported earlier (Sudan *et al.*, 2012).

During the study period, seven (1.08%) of the 649 faecal samples screened through coprological examination were found to be infected with *B. coli* (Table 1). A wide variation in prevalence rates ranging from 1.28% to 51.43% have been reported in India (Sinha *et al.*, 1976; Palanivel *et al.*, 2005). The lower prevalence (1.08%) recorded in current study is concurrent to the findings of Sinha *et al.* (1976), Motaleb (1996) and Choubisa and Jaroli (2013). However, higher prevalence rates have been recorded from the various parts of India by Godara and Manohar (2004), Niphadkar and Raote (1994), Sreedevi (2012) and Gupta *et al.* (2014). Such variations might be due to difference in the sample size, selection of specific samples, geographical locations/topography, climatic conditions, managemental and nutritional (factors of the animals (Roy *et al.*, 2011). Balantidiosis was not found in buffaloes in the current study, however, infection of *B. coli* in buffaloes have been on records from different tropical and subtropical countries like India (Gupta *et al.*, 2014); Pakistan (Tarrar *et al.*, 2008); Bangladesh (Roy *et al.*, 2011). Higher prevalence in native cattle may be attributed to the fact that the native animals are raised on extensive or semi-intensive grazing as compared to crossbred cattle and buffaloes which are mainly stall fed with comparatively improved animal husbandry practices (Mir *et al.*, 2013; Akanda *et al.*, 2014).

Table: 1
Season wise and district wise prevalence of Balantidiosis in dairy animals of semi-arid eastern plains of Rajasthan

Variables		No. of samples examined	Positive (%)
Season	Summer	172	0 (0)
	Rainy	200	3 (1.5)
	Winter	277	4 (1.44)
χ^2 Value	-	-	2.55
District	Jaipur	161	1 (0.62)
	Ajmer	183	2 (1.09)
	Tonk	161	4 (2.48)
	Dausa	144	0 (0)
χ^2 Value	-	-	4.87
Total	-	649	7 (1.08)

The seasonal prevalence of balantidiosis in dairy animals of semi-arid eastern plain zone of Rajasthan is represented in Table 1. A statistically non-significant seasonal variation in prevalence was observed, with highest prevalence in rainy season (1.5%) in cattle which is in agreement with the findings of Sreedevi (2012) and Gupta *et al.* (2014). Rainy season provides optimum condition of high

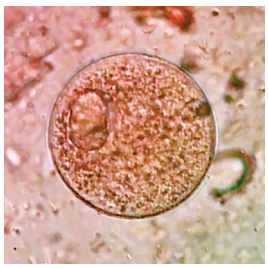

Fig. 1. Cyst of *B. coli*

Fig. 2. Trophozoite of *B. coli*

humidity and ambient temperature required for development of pre-parasitic/infective stages such as eggs, cysts and oocysts (Gupta *et al.*, 2014) and higher chances of feed contamination that enhance the rate of infection of *B. coli* (Roy *et al.*, 2011). Reduced immuno-tolerance in rainy season may also be responsible for higher incidence of various infections during monsoon season (Murleedharan, 2005). Highest prevalence was recorded during rainy season followed by winter and summer which was similar to the trends reported by Mamun (2008) and Aktaruzzaman *et al.* (2013).

District-wise prevalence rates in semi-arid eastern plains of Rajasthan are represented in Table 1. District-wise prevalence revealed that highest prevalence of balantidiosis in Tonk district (2.48%) followed by Ajmer (1.09%), Jaipur (0.62%) whereas, infection was not recorded from Dausa district. Highest prevalence in Tonk district may be attributed to the fact that the region receives higher rainfall as compared to other districts, leading to the favourable conditions in terms of temperature and moisture for growth and perpetuation of *B. coli* as per Clarke and Diamond (2002), who stated that *B. coli* grows at temperatures between 20°C and 40°C.

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