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RESEARCH ARTICLE

SERO-PREVALENCE OF *TOXOPLASMA GONDII* IN CATTLE FROM ASSAM

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ABSTRACT

Prevalence of *Toxoplasma gondii* infection among cattle of Assam was determined serologically by Modified agglutination test (MAT) and Latex agglutination test (LAT). MAT showed 26.66% sero-prevalence against 16.66% recorded by LAT in sera of open grazing cattle. Antibody titres in positive sera ranged from 1:25 to 1:3200 in MAT while in LAT the highest titre recorded was 1:256. Sera from farm borne stall-fed cattle were all negative in both the tests suggesting lack of their exposure to infective cat faeces.

INTRODUCTION

Toxoplasma gondii, a protozoan parasite of public health importance is widely prevalent among animals and birds. Domestic cats are the definitive host and are responsible for dissemination of infection through faecal contamination of pastures, food and water. Consumption of raw and undercooked meat, transplacental transmission are the other methods of dissemination of infection. In animals the infection is usually subclinical although phenomenon of congenital transmission leading to abortion and neonatal mortality has been reported in animals including small ruminants (Dubey and Beattie, 1988). In cattle and buffaloes, the infection is usually subclinical and they remain as source of infection to man and carnivores through carnivorism. Diagnosis of *T. gondii* infection is a challenging task in which serological screening is the only practical diagnostic tool to monitor the status of infection. There are reports on detection of anti-toxoplasma antibodies in animals from different parts of India (Chhabra *et al*., 1985, Devada *et al*., 1998). However, information on the prevalence of this parasite from the northeastern region of India is scanty. The present communication reports the results of serological investigation using Modified agglutination test (MAT) and Latex agglutination test (LAT) for determination of *T. gondii* prevalence in cattle of Assam.

MATERIALS AND METHODS

Blood samples in 15-20 ml volume each were collected in sterilized tubes without anticoagulant from 60 apparently healthy indigenous open grazing adult cattle during slaughter at a local abattoir. Another 25 blood samples were collected by jugular vein puncture from farm borne and stall-fed healthy crossbred adult cattle of the Instructional Livestock Farm of the College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati. Sera were separated from the blood samples and stored in vials at – 20°C for serological study to detect *Toxoplasma* antibodies by Modified agglutination test (MAT) and Latex agglutination test (LAT). MAT was performed in test sera at 2-fold dilution beginning from 1:25 according to the procedure described by (Dubey and Desmonts 1987) using formalin fixed whole tachyzoites of *T. gondii* as antigen along with known positive and negative control sera obtained from the Animal Parasitology Institute, US Department of Agriculture, Maryland, USA. The test was performed in round bottom well microtitre plate by adding 25 µl diluted sera and equal amount of working antigen to each well. The plate was shaken, covered with sealing tape and incubated at 37°C overnight. The plate was read next day for antigen-antibody reaction. Presence of matting at the bottom of the well similar to that of positive control was considered antibody positive while a clear button shaped blue deposition was interpreted as antibody negative.

LAT was performed with commercial "Toxogen" kit (Tulip Diagnostics Pvt. Ltd., Goa, India) as per recommended procedure in the serum samples diluted at first 1:16 with 0.9%

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normal saline solution. The test was read after five minutes for macroscopic agglutination in presence of positive and negative controls. Serum samples which were antibody positive at 1:16 dilution was further assessed in a similar way semi-quantitatively at two-fold dilution from 1:32. Highest dilution of serum showing macroscopic agglutination was considered as the titre of antibodies to *T. gondii*.

RESULTS AND DISCUSSION

In the present study, out of 60 samples from open grazing cattle 16 sera were found positive to *Toxoplasma* antibodies in MAT, the percentage of sero-prevalence being 26.66% (Table 1). Antibody titre in positive sera ranged from 1:25 to 1:3200. Out of 16 positive sera, 14 (87.5%) animals showed antibody titre at or above 1:100 with the highest titre of 1:3200 in 2 (12.50%) animals. Sera samples from farm borne stall fed cattle were all negative to *Toxoplasma* antibody in MAT.

Sera samples of open grazed cattle employed in LAT showed 16.6% antibody positive at 1:16 dilution. Semi quantitative test conducted further in the antibody positive sera showed 1:256 as the highest titre in 10% animals while maximum seropositive animals (40%) showed a titre of 1:64 (Table 2). Sera from farm borne and stall fed cattle were all antibody negative in LAT also similar to antibody negative result obtained in MAT.

Table 1 Antibodies to *Toxoplasma gondii* in serum samples of open grazing cattle (N=60) in Modified Agglutination test (MAT)

Serum dilution	No. of serum samples positive for *Toxoplasma* antibodies	Percentage
1:25	1	6.25
1:50	1	6.25
1:100	4	25.00
1:200	2	12.50
1:400	1	6.25
1:800	2	12.50
1:1600	3	18.75
1:3200	2	12.50
Total	16	26.66

N.B. Serum samples of stall-fed cattle (n=25) were antibody negative.

Table 2 Titre of *Toxoplasma gondii* antibodies in serum samples of open grazing cattle (n=60) examined by semi quantitative Latex agglutination test (LAT)

Serum dilution	No. of serum samples positive for *Toxoplasma* antibodies	Percentage
1:32	3	30.00
1:64	4	40.00
1:128	2	20.00
1:256	1	10.00
Total	10	16.66

N.B. Serum samples of stall-fed cattle (n=25) were antibody negative.

The results of MAT in the present study are comparable with (Dubey *et al*. 1985) who reported 1:100 titre in MAT to be specific for *T. gondii* infection in cattle. Of late, LAT has been widely used for screening of *T. gondii* infection in farm animals (Lashari *et al*. 2010; Khalil and Elrayah, 2011) for its 90% sensitivity and specificity. However, in the present study sero-detection of *T. gondii* antibody in LAT was found lower than that in MAT. This agrees to the report of (Dubey *et al*. 1985 and Vijaya Bharathi *et al*. 2013).

Evidence of *Toxoplasma gondii* infection recorded in the open grazing cattle of Assam is in agreement with the previous reports published from different parts of India in cattle (Chhabra *et al*., 1985; Mirdha *et al*., 1999), buffaloes (Selvaraj *et al*., 2007), sheep and goats (Dubey *et al*., 1993; Sreekumar, 2001), dog (Vijaya Bharathi *et al*., 2013) and chicken (Devada *et al*., 1998). However variations in the infection rate as observed in the different geographical regions might be associated with the serological test employed and other factors such as management, hygienic standards, cat population and environmental conditions (Tenter *et al*., 2000). The latter factors may also perhaps be applicable to negative sero-detection of *T. gondii* antibody in farm borne cattle of organized farm compared to positive report observed in open grazed cattle of the present study. Thus the role of domesticated food animals in the spread of *T. gondii* infection is enormous and deserve serious attention for further study in view of increased incidence of infection among men and women in India (Yasodhara *et al*., 2004).

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