PREVALENCE OF THEILERIOSIS IN CATTLE IN KARNATAKA STATE

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ABSTRACT

Blood and sera samples collected from 258 animals of four different locations viz: Chinthamani Taluk, Veterinary Hospital, Yelahanka, Dairy Farm and Veterinary College Hospital, Hebbal examined by blood smear examination and Dot-ELISA to study the prevalence of theileriosis. The overall prevalence of theileriosis in the present study was found to be 26.74 per cent by blood smear examination and 55.81 per cent by Dot-ELISA. There was a significant difference in the results of blood smear examination and Dot-ELISA ($P \leq 0.05$). On blood smear examination, T. annulata organisms were predominantly of ring form. The prevalence of theileriosis Veterinary College Hospital, Hebbal was found to be 17.33 per cent by blood smear examination and 36 per cent by Dot-ELISA. At Veterinary Hospital, Yelahanka the prevalence of theileriosis was found to be 7.04 per cent by blood smear examination and 63.38 per cent by Dot-ELISA. College Dairy Farm, 13.33 per cent were positive by blood smear examination and 35.56 per cent were positive by Dot-ELISA. In Chintamani Taluk, the prevalence was found to be 67.16 per cent by blood smear examination and 83.58 per cent by Dot-ELISA

Key Words: Theileriosis, Blood smear examination, Dot-ELISA

INTRODUCTION

T.annulata is the predominant species causing tropical bovine theileriosis, which is principally transmitted by Hyalomma anatolicum anatolicum although, other species of ticksmay also be involved epidemiologically (Bhattacharyulu et al., 1975). Renukaprasad (1978) in Karnataka found the prevalence of T. annulata in indigenous, exotic and crossbred cattle to be 80.0, 59.5 and 49.1 per cent, respectively by capillary tube agglutination test. Complement fixation test was carried out by Sastry et al. (1981) to detect antibodies to T. annulata in Karnataka state. The prevalence in pure exotic breeds, crossbreds and indigenous cattle was found to be 56.7 per cent, 45.2 per cent and 25 per cent respectively. Murthy et al. (1986) found 35 out of 78 cattle positive for T. annulata antibodies using tube agglutination test in Karnataka State. The present work was undertaken to study the current status on the prevalence of theileriosis in some parts of Karnataka using blood smear examination and Dot-ELISA.

MATERIALS & METHODS

Blood and sera samples collected from 258 animals of four different locations viz: Chinthamani Taluk, Veterinary Hospital, Yelahanka, Dairy Farm and Veterinary College Hospital, Hebbal were examined by blood smear examination and Dot-ELISA to study the prevalence of theileriosis. Blood samples were collected for smear examination and serum was separated for detection of antibodies by Dot-ELISA.

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T.annulata infected lymphocyte culture (10 million cells/ml, 150P) obtained from Indian Immunologicals, Hyderabad (Raksha Vac-T™), was used as a source of schizont antigen. T.annulata infected lymphocyte culture (20 ml) was first pelleted at 300 x g using a refrigerated centrifuge (Superspin R). The pellet was resuspended in 20 ml phosphate buffer saline (PBS pH 7.2) and centrifuged again at 300 x g for 30 minutes. This process was repeated three times to remove extraneous materials present in the commercial vaccine preparation. Finally, the pellet was resuspended in PBS (20 ml). The cells were gently disrupted in a glass tissue homogeniser (Borosil) at 4ºC for 10 minutes. The cell suspension was held in an ice bath during homogenization.

The separation of schizonts present in the cell homogenate was achieved by centrifuging the suspension at 300 x g for 30 minutes to deposit the host cell nuclei. The supernatant containing schizonts was stored at -20^{0}C. The schizont preparation was ultrasonicated in an ice bath for five cycles of 30 seconds each with 10 seconds gap at maximum amplitude in a 150 W MSE sonicator (Soniprep 150, Sanyo). The sonicate was further treated with 0.2 per cent Triton X-100 in PBS and allowed to stand for three hours at 4^{0}C. The preparation was centrifuged at 1000 x g for 30 minutes in a refrigerated centrifuge. The supernatant thus obtained was stored in aliquots of 100µl at -80^{0}C. This served as an antigen for Dot-ELISA. The protein content of the sonicated schizont antigen was determined as per Lowry et al., 1951.

Giemsa stained blood smear examination: Fresh smears were made and quickly dried by waving in the air and stained with Giemsa stain using standard procedure as described by Schalm et al. (1975). The stained smears were microscopically examined under oil immersion.

Dot-ELISA: Dot-ELISA test was performed using nitrocellulose strips according to the method described by Prasanna et al. (2001).

RESULTS AND DISCUSSION

Blood and sera samples from 258 animals were examined by blood smear examination and Dot-ELISA to study the prevalence of theileriosis. The results of the study in four different study areas are presented in Table1and Fig. 1.

The overall prevalence of theileriosis in the present study was found to be 26.74 per cent by blood smear examination and 55.81 per cent by Dot-ELISA. There was a significant difference in the results of blood smear examination and Dot-ELISA ($P \leq 0.05$). On blood smear examination, T. annulata organisms were predominantly of ring form.

In the present study, ring form of T. annulata organism was predominantly found on blood smear examination. However, Venugopal (1983) reported oval forms of the parasite in higher percentage as compared to rod and ring forms. In Karnataka state, Renukaprasad, 1978 reported a prevalence of 47.12 per cent by Capillary tube agglutination test and Murthy et al., (1986) reported a prevalence of 44.87 per cent by tube agglutination test. However, Venugopal (1983) found the prevalence to be 36.4 per cent by blood smear examination. The overall prevalence in the present study is slightly higher compared to previous studies in Karnataka state indicating that the prevalence of theileriosis has not declined over the years.

Further, Venkataraman et al. (1984) in Chennai, Tamil Nadu reported a prevalence of 5.85 per cent by blood smear examination and 33.65 per cent using CFT, while Sundar et al. (1993) reported 54.2 per cent by ELISA. Soundararajan et al. (2000) reported a prevalence of 22.8 per cent by blood smear examination and 66.4 per cent by ELISA in Tamil Nadu. These results are comparable to the prevalence recorded in Karnataka State.

With regard to different locations, out of 75 samples examined from Veterinary College Hospital, Hebbal the prevalence of theileriosis

was found to be 17.33 per cent by blood smear examination and 36 per cent by Dot-ELISA. At Veterinary Hospital, Yelahanka 71 animals were examined and the prevalence of theileriosis was found to be 7.04 per cent by blood smear examination and 63.38 per cent by Dot-ELISA. Out of 45 animals examined in College Dairy Farm, 13.33 per cent were positive by blood smear examination and 35.56 per cent were positive by Dot-ELISA. In Chintamani Taluk, a total of 67 animals were examined to determine the prevalence of theileriosis in the region. The prevalence was found to be 67.16 per cent by blood smear examination and 83.58 per cent by Dot-ELISA. There was a significant difference ($P \leq 0.05$) in the results of blood smear examination between different locations. Similarly the results of Dot-ELISA in the different locations were significantly different ($P \leq 0.05$). Better methods of tick control would have contributed to low prevalence in College Dairy Farm. Wide prevalence of tick vector, increasing number of exotic crossbred cattle, inadequate tick control measures may be some of the important factors considered responsible for the high prevalence in Chintamani Taluk, Karnataka. This warrants adoption of better tick control methods and also improvement in management, to reduce the prevalence of theileriosis so that the economic impact of this disease on farmers in Karnataka can be reduced.

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Table - 1

Prevalence of Theileriosis in Cattle in Four Study Areas.

Location	Number Examined	Number positive (per cent)	
		Blood smear	Dot-ELISA
Veterinary College Hospital	75	13 (17.33)[a]	27 (36)[p]
UAS Veterinary Hospital, Yelahanka	71	5 (7.04)[b]	45 (63.38)[q]
UAS Dairy Farm	45	6 (13.33)[c]	16 (35.56)[r]
Chintamani Taluk	67	45 (67.16)[d]	56 (83.58)[s]
Total	258	69 (26.74)[x]	144 (55.81)[y]

Different superscripts within a test indicate significant difference (P≤0.05)
Different superscripts overall (total) between tests indicate significant difference (P≤0.05)

Fig -1

Prevalence of Theileriosis in Cattle in Four Study Areas