

## SEROPREVALENCE OF *TRYPANOSOMA EVANSI* IN BUFFALOES IN SOUTH WESTERN SEMI ARID PLANE ZONE OF UTTAR PRADESH

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### ABSTRACT

In present investigation seroprevalence of trypanosomosis in buffaloes were assessed using monoclonal antibody based-latex agglutination test (TE-LAT). Out of 2494 buffaloes reported, a total of 890 serum samples of suspected buffaloes were collected during the period from June, 2013 to May, 2014, from various places of south western semi arid plane zone of Uttar Pradesh. Overall seroprevalence of 18.56% and suspected seroprevalence of 52.02% were obtained indicating endemicity of surra in buffaloes of the region. Trypanosomosis was found prevalent throughout the year in the region and higher prevalence was observed in monsoon and post monsoon months followed by winter months and least in the summer months.

**Keywords:** buffalo, *Bubalus bubalis*, seroprevalence, Surra, trypanosomosis, TE-LAT

### INTRODUCTION

Trypanosomiasis is an important vector born disease occurring in tropical and subtropical countries including India (Da-Silva *et al.*, 2009). It causes epidemics of a disease called Surra, which

is of great economic importance in Africa, Asia and South America, where thousands of animals die from *T. evansi* infection each year (Fernandez *et al.*, 2009). The infection is mechanically transmitted by blood-sucking insects of the genera *Tabanus*, *Stomoxys*, *Atylotus* and *Lyperosia* etc, but in India mostly by Tabanid biting flies (Vijay *et al.*, 2002). Clinical signs are variable and non-specific (Killick-Kendrick, 1968). The disease in bovines is characterized by severe anaemia, nervous complications, weight loss, reduced productivity, infertility and abortion and death in some animals during the early phase of the disease (Juyal *et al.*, 2005). Effects of the infection in different geographical locations vary according to the strain of parasites and species of the host (Losos, 1980).

The standard parasitological methods have low sensitivity and cannot be relied upon for epidemiology and chemotherapy especially in bovines. Various serological tests like indirect immunofluorescent antibody test (IFAT), enzyme linked immunosorbent assay (ELISA) and card agglutination test for trypanosomiasis (CATT) are used to identify the specific antibody response but they are still not applicable in field conditions. TE-LAT is a monoclonal antibody-based latex agglutination test for the diagnosis of Surra in domestic, zoo and wild animals and quite suitable for field-level diagnosis (Shyma *et al.*, 2012).

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There is no any comprehensive work reported in the literature regarding prevalence studies in buffaloes in India and particularly in south western semi arid plain zone of Uttar Pradesh, but clinical and subclinical cases are very much prevalent in buffaloes of the region (Figure 1). Therefore keeping in view of endemicity and importance of trypanosomiasis in the region the present investigation was done with a comprehensive plan to evaluate seroprevalence of *T. evansi* and attempts were also made to investigate various host related epidemiological factors affecting the prevalence of trypanosomiasis in buffaloes of the region.

## MATERIALS AND METHODS

The study was performed on buffaloes of south western semi arid plain zone of Uttar Pradesh (NARP, ICAR) from June, 2013 to May, 2014. Clinically sick buffaloes brought to TVCC, DUVASU, Mathura from different districts of the region viz. Mathura, Agra, Kasganj, Hathras, Aligarh, Etah, Firozabad and Manपुरी were undertaken in the study. Animals exhibiting clinical signs suggestive of surra such as fever, anorexia, loss of production and loss of body condition were selected for study. Total number of buffaloes coming to the TVCC for different ailments and



Figure 1. South western semiarid plane zone of Uttar Pradesh (Source: www.csauk.ac.in).

number of buffaloes suspected, were recorded on monthly basis. Diagnosis of trypanosomiasis was done by monoclonal antibody based latex agglutination test (TE-LAT). Simultaneously every animal under study were treated accordingly as per their tentative clinical conditions.

The blood samples from suspected buffaloes were collected from jugular vein in clean, dry blood collection vials of 10 ml capacity without any anticoagulant and were allowed to stand undisturbed in slant position for about 3 to 4 h. The clots were retracted and the serum separated after rapid centrifugation. Extreme care was taken to prevent hemolysis. The serums collected were stored in a deep freeze at  $-20^{\circ}\text{C}$  in vials, which were properly capped and labeled till analysis.

Diagnosis of trypanosomiasis was done by TE-LAT, a monoclonal antibody-based latex agglutination test for the diagnosis of Surra in domestic, zoo and wild animals (Invented at LLRUVAS, Hisar, Haryana, India). Standard protocol was followed as proposed by inventor. Agglutination was indicated by appearance of granules or curdle-like aggregates in the solution mixed with the serum sample that contained *T. evansi* circulating antigen. The blue reagent

turned watery with blue granules settling out from the solution (Figure 2). The samples showing agglutination within 5, 10 and 15 minutes were marked as positive. Intermittent swirling of the reagent on the spot was done. All other samples which did not show the agglutination within 15 minutes were declared as negative (Figure 3).

Epidemiological studies of trypanosomiasis in buffaloes were done by analyzing data in term of overall prevalence; suspected prevalence and month wise prevalence were assessed as per formulas for prevalence study (Thrusfield, 2008).

## RESULTS AND DISCUSSION

In present study a total of 2494 buffaloes were reported to TVCC, DUVASU, Mathura for various ailments, out of which serum samples of 890 suspected buffaloes were collected. For assessment of seroprevalence and host related epidemiological studies we had used TE-LAT as a diagnostic test, which revealed the presence of circulating *T. evansi* antigen in 463 cases showing a seroprevalence of 18.56% (overall) and 52.02 (suspected) indicating endemicity of surra in



Figure 2. TE-LAT (*T. evansi* positive, showing, agglutination).

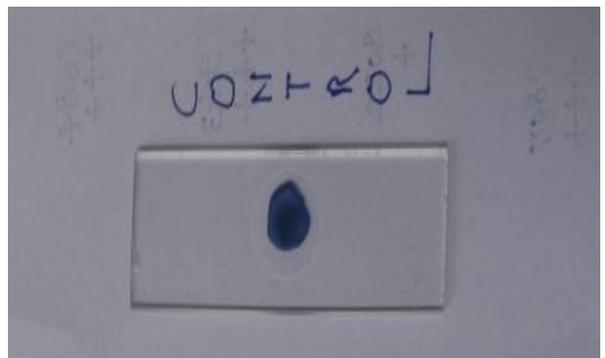


Figure 3. TE-LAT (Control).

buffaloes in the region (Table 1). On analyzing month wise prevalence the maximum prevalence was recorded during month of September followed by the month of October and the least prevalence was recorded in the month of June (Table 1). In order of decreasing prevalence, the results were as follows: September, October, January, February, December, August, November, March, May, April, July and least in June month. It can be said that disease was more prevalent in the months of monsoon and post monsoon followed by winter months and least in the summer months.

The high prevalence of trypanosomiasis detected in buffalo population of the region, could be explained by favorable environmental condition for breeding of vector flies in low lying areas due to presence of river basins of Ganga and Yamuna in the region (Juyal, 2011). There are only few reports

in the literature describing seroprevalence (%) of *T. evansi* in buffaloes. Shyma *et al.* (2012) reported 78.26% diagnostic sensitivity of MAb-LAT in suspected cases of buffaloes, which is quite higher to our observation. Singla *et al.*, 2013, reported the overall seroprevalence of *T. evansi* in buffaloes as depicted by CATT was significantly higher (44.68%) in the state of Punjab, which is quite higher than present investigation; the reasons could be that in this study small population of buffaloes were examined however we had examined quite a large number of buffaloes. Nguyen *et al.*, 2013 reported 22.24% seroprevalence of trypanosomiasis in water buffaloes of North Vietnam using CATT which is more or less similar with our findings.

The variations in the prevalence pattern of *T. evansi* infections in buffaloes could be due to the vector population increase in considerable

Table 1. Percent seroprevalence of trypanosomiasis in buffaloes in south western semi arid plane zone of Uttar Pradesh.

S.N.	Month	Total no of buffaloes reported	No of cases examined (Suspected)	TE-LAT positive no of cases	Suspected prevalence (%)	Overall prevalence (%)
1	June	254	74	28	37.83	11.02
2	July	176	78	34	43.58	19.31
3	August	190	82	42	51.22	22.10
4	September	269	139	95	68.34	35.32
5	October	201	100	63	63	31.34
6	November	143	54	25	46.29	17.48
7	December	159	50	26	52	16.35
8	January	160	50	28	56	17.50
9	February	162	51	27	52.94	16.67
10	March	258	69	31	44.92	12.02
11	April	239	65	29	44.61	12.13
12	May	283	78	35	44.87	12.37
<b>Total</b>		<b>2494</b>	<b>890</b>	<b>463</b>	<b>52.02</b>	<b>18.56</b>

number during rainy and post-rainy seasons than the winter and summer seasons of year. Inclement weather such as hot and humid climate in the months of monsoon and thereafter might have been incriminated to depress the body defense mechanism thereby resulting in the exacerbation of *T. evansi* infection. Similar findings were also reported by Muraleedharan *et al.* (2005) who reported that *T. evansi* infection rate was high in south west monsoon followed by north east monsoon and the lowest incidence was recorded in hot weather followed by cold weather. Lohr *et al.* (1986) observed the high rate of infection during the rainy season. Sinha *et al.* (2006) evaluated the highest incidence during monsoon followed by winter and least during summer season. Awandkar *et al.* (2004) reported a prevalence of trypanosomes in cattle and buffaloes and found it to be highest in monsoon followed by post-monsoon, winter and summer seasons. Rundassa *et al.* (2013) found relatively higher incidence rate during the wet seasons of the year.

In conclusion trypanosomiasis is found to be highly endemic and prevalent throughout the year of study in the region and higher prevalence was observed in monsoon and post monsoon months.

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