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Prevalence of bovine trypanosomosis in and around Jabalpur

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Abstract

Bovine trypanosomosis is an important haemoprotozoan disease of economic importance characterized by high temperature, progressive anemia, loss of condition and reduction in milk yield. The work was conducted in the department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University Jabalpur and nearby dairy farms in and around Jabalpur. The present study was undertaken to study the prevalence, in buffaloes. During the present investigation a total of 118 buffaloes of either sex, age group and parity were screened on the basis of common clinical signs of trypanosomosis *viz.* fever, oedema of dependent parts, head pressing, circling etc. The overall prevalence of trypanosomosis was found to be 15.25%. The sex wise prevalence was found to be 15.78% (18/114) in female and in male 0% (0/4) whereas, age wise prevalence of trypanosomosis was found as 5.55 % in buffaloes upto <2 years, 11.11% between 2-5 years and 32.14% >5 years of age. The parity wise prevalence recorded was 5.55 % in zero parity, 9.09 % in 1st parity, 25% in 2nd and 16% ≥ in 3rd parity.

Keywords: Trypanosomosis, prevalence, buffaloes

Introduction

Trypanosomosis is a haemoprotozoan disease entity caused by various members of *Trypanosoma* spp. affecting different species of domestic and wild animals and characterized by intermittent fever, anaemia and there is widespread tissue damage such as the heart, skeletal muscles, endocrine system and reproductive tract. (Jaiswal *et al.*, 2015) [14].

Bovine trypanosomosis (*Surra*) caused by *Trypanosoma evansi* is an important haemoprotozoan disease of buffalo which is characterized by high temperature, progressive anaemia and cutaneous eruptions. Infection is mechanically transmitted by blood-sucking insects of the genera *Tabanus*, *Stomoxys* etc. but in India mostly by tabanid biting flies (Vijay *et al.*, 2002) [35]. Trypanosomosis ranks high in importance because of devastating effects on the livestock health leading to severe economic loss to the dairy industry due to loss of condition, reduction in milk yield etc. (Dereje Tulu *et al.*, 2018) [8]. Total economic losses due to *Surra* recorded is INR 9,872.33 per lactation in buffaloes (Singh *et al.*, 2014) [33].

It is a major killer disease of livestock that leads to major economic losses to the farmers in view of morbidity and mortality, decreased milk yield. Extensive use of trypanocides and by interference with vaccination programme of domestic animals in India. The parasite causes severe anemia, edema, immune suppression and various neurological signs by entering the nervous tissue resulting in death of affected animals. It is repetition in cattle and buffaloes act as carriers most frequently in some of the parts in India.

Trypanosomosis directly affects the productivity of cattle by reducing birth rates, increasing abortion rates and increasing mortality rates (Merasha *et al.*, 2013) [22]. However, the incidence of trypanosomosis in cattle and buffaloes in India has been under estimated because the infection in them usually subclinical and buffaloes may act as reservoirs (Rani *et al.*, 2015) [26]. The aim of this study was to know the prevalence of trypanosome species circulating in bovine.

Materials and Methods

Animals

A total of 118 animals were screened on the basis of common clinical signs of trypanosomosis *viz.* Anorexia, temperature, edema of dependent parts, head pressing, excitement, circling, salivation, ocular discharge etc. Details are shown in Table 01.

Table 1: Clinical symptoms observed in screened buffaloes

S. No.	Clinical symptoms	No. of buffaloes	Frequency distribution (%)
1.	Anorexia	97	82.20
2.	Temp.	104	88.13
3.	Depression	92	77.96
4.	Reduced milk yield	87	73.72
5.	Emaciation	18	15.25
6.	Anemia	8	6.77
7.	Oedema	23	19.49
8.	Head pressing	39	33.05
9.	Excitement	41	34.74
10.	Circling	21	17.79
11.	Exophthalmia	4	3.38
12.	Corneal opacity	6	5.08
13.	L.N. Enlargement	5	4.23
14.	Salivation	75	63.55
15.	Ocular discharge	69	58.47
16.	Generalized paralysis	0	0
17.	Muscular twitching	0	0

*Study was done on the basis of age, sex and parity.

Collection of samples for diagnosis

Five ml blood was collected aseptically from jugular vein of each animals with the help of 18 gauge needle and stored in clean, dry, sterilized labelled glass vials containing EDTA @ 1mg/ml of blood.

Diagnostic study

Diagnosis of Trypanosomosis were done on the basis of Parasitological examination. Following techniques were used for the diagnosis of Trypanosomosis.

Blood Smear Method: Giemsa stain

A small drop of blood was placed 20 mm from one end of a clean microscopic slide and a thin film is drawn. The film was air-dried briefly, fixed in absolute methanol for 2 minutes and allowed to dry. The smears were then stained by Giemsa (1 ml Giemsa + 9 ml Distilled Water) for 25 minutes then the slide was washed in tap water and dried. Slides were seen under microscope at 100x using Imersion oil (Jain, 1986) [13].

Results and Discussion

T. evansi is a major killer disease of livestock, which causes considerable economic losses to the farmers in term of morbidity and mortality, decreased milk yield, extensive use of trypanocides and by interference with vaccination programmes of domestic animals in India.

Prevalence

The proposed work was conducted in the department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry and Instructional Livestock Farm Complex, Adhartal, Nanaji Deshmukh Veterinary Science University (NDVSU), Jabalpur and nearby private dairy farms in and around Jabalpur.

Overall Prevalence

During the study a total of 118 buffaloes of either sex between the age of <2 years to > 5 years were screened for the presence of Trypanosoma infection on the basis of common clinical signs of the disease viz. anorexia, temperature, edema of dependent parts, head pressing, excitement, circling, salivation, ocular discharge etc. The overall prevalence of bovine trypanosomosis recorded was 15.25% (18/118). Details are shown in table 02.

Table 2: Overall prevalence of trypanosomosis in buffaloes

No. of buffaloes screened	No. of positive buffaloes	Prevalence (%)
118	18	15.25

The present prevalence rate is more or less is in agreement with the findings of Laha *et al.* (2009) [19] who have recorded as 9.4% prevalence in Eastern India. Our observations tallied with the observations obtained by Krishnappa *et al.* (2002) [17] as 12.90% prevalence in trypanosomosis infected buffaloes. However, these findings are higher than the prevalence reported by. Laha *et al.* (1989) [20], Das *et al.* (1998) [7], Bhaskar Rao & Hafeez (2005) [3] who have recorded a lower prevalence of 2.69%, 2.71% (Guntur) and 7.28% (Godavari) respectively in buffaloes from various part of India.

On the contrary, the higher prevalence rate obtained by Kumar (2017) [18] as 22.90% in Mathura and Roy *et al.* (2004) [27] who have recorded as 22.03% in Chhattisgarh. Further, Chhabra *et al.* (1978) [6] have reported 20.20% prevalence in Haryana.

Similarly, Singh and Joshi (1991) [31] have also reported 20% prevalence at Parbhani. These observations differed with the findings of Sinha *et al.* (2006) [34] as 41.14% prevalence of *T. evansi* in Bihar and by Krisshanapa *et al.* (2002) [17] as 42.12% in Karnataka which were much more than the findings of earlier researchers.

The prevalence of trypanosomosis was recorded higher in buffaloes than in cattle. Similarly, Laha *et al.* (2009) [19] and Agrawal (2016) [1] have reported 9.4% and 20.26% in buffaloes than 5.3% and 5.80% respectively in cattle. On the contrary, Harish *et al.* (2006) [12] reported high prevalence (8.93%) in cattle than 4.18% in buffaloes.

Sex wise prevalence

During the present study the sex wise prevalence recorded as more in female i.e. (15.78%) 18/114 than the male 0/4 (0%). Details are shown in table 03.

Table 3: Sex wise prevalence of trypanosomosis in buffaloes

S. No.	Sex Group	Total no. of buffaloes	No. of positive buffaloes	Prevalence (%)
1.	Male	4	0	0
2.	Female	114	18	15.78

Similarly, Sinha *et al.* (2006) [34] were also of the same opinion. However Chanie *et al.* (2012) [5] have also reported the higher prevalence in female (14.9%) than the male (12.30%) in oramia. However, Elamin *et al.* (1998) [9], Shimelis *et al.* (2009) [29], Eyasu *et al.* (2013) [10], Mbahin *et al.* (2013) [21], Mulugeta *et al.* (2013) [23] have found that infection rate of trypanosomosis in buffaloes has no bearing on any of the sex. However, Rundassa *et al.* (2013) [28] found no statistically significant difference ($p>0.05$) in either sex European cattle.

Further, Batu *et al.* (2017) [2] have also opined almost similar prevalence in male (4.93%) and female (4.95%) in cattle.

The possible explanation for higher prevalence in female is the stress of lactation and pregnancy that predisposed for the infection. However, under the study the higher prevalence recorded in female (15.78%) is because of the meager no. of males screened. On the contrary, Singh *et al.*, (2012) [32] reported significantly higher incidence in male in GADVASU ($p<0.05$) in cattle.

Age wise prevalence

The present study showed significant increase in prevalence of trypanosomosis in buffaloes with increase in age. The age wise prevalence was recorded 32.14% in age group of >5 years, 11.11% in age group of 2-5 years and 5.55% in <2 years of age. The results revealed highest prevalence in >5 years amongst infected buffaloes which may be due to the predisposing stress factors viz. Lactation, pregnancy, nutritional and climatic changes etc. Details are shown in table 04.

Table 4: Age wise prevalence of trypanosomosis in buffaloes

S. No.	Age Group	Total no. of buffaloes	No. of positive	Prevalence (%)
1.	<2 yr	18	1	5.55
2.	2-5 yr	72	8	11.11
3.	>5 yr	28	9	32.14

Moreover, the findings of the present study are in agreement with the findings of Muraleedharan *et al.* (2005) [24] and Bhutto *et al.* (2010) [4] who have reported the highest prevalence in adult animals greater than 5 years old.

These findings are also tallied with the results obtained by Pyane *et al.* (1991) [25] and Singh *et al.* (2017) [30] who have also found the highest prevalence in >5 years followed by 2 to 5 years of age and lowest in <2 years of age group of the buffaloes infected with trypanosome infection.

The observation of Chanie *et al.* (2012) [5] differed from the present study who have reported maximum prevalence (16.50%) in >3 years. Similar results have been obtained by Sinha *et al.* (2006) [34] who got higher prevalence between 2-4 years of age. Further, the higher prevalence in adult buffaloes was also reported by Krishanappa *et al.* (2002) [17], Roy *et al.* (2004) [27] and Muralidharan *et al.* (2005) [15] and Rani *et al.* (2015) [26] who have reported (88.88%). Highest prevalence in adult buffaloes. The reason may probably due to the exhausted immune system leads to the old age susceptibility to the infection. Moreover, the demand of production and reproduction including low immunological and nutritional status of the animals.

The findings of the present study revealed lowered prevalence (5.55%) in <2 years, which are in agreement with Fimmen *et al.* (1999) [11]. The possible reason of lower prevalence in younger animal are their natural protection to some extent by maternal antibodies. Mbahin *et al.* (2013) [21] also found high prevalence in older animals (20.21%) than young animals (36.53%).

Parity Wise Prevalence

The results of the present study revealed highest prevalence (25%) in 2nd parity, 16% in ≥ 3 party, 9.09% in 1st parity and least (5.55%) in zero parity. Details are shown in table 05.

Table 5: Parity wise prevalence of trypanosomosis in buffaloes

S. No.	Parity wise	Total no. of buffaloes	No. of positive buffaloes	Prevalence (%)
1.	Zero	18	1	5.55
2.	1	22	2	9.09
3.	2	28	7	25
4.	≥3 times	50	8	16

These results differed with those of Singh *et al.* (2017) [30] who have obtained the highest prevalence (62.80%) in more than > 3 parity and 56.47% in 2nd parity.

The findings of Kumar (2017) [18] differed with the present findings who have reported that the prevalence of Trypanosomosis increased (30.84%) with parity (>3 parity) and 24.88% in 2nd parity in their study. The higher prevalence recorded with increased parity is because of the stress as predisposing factor created due to lactation and pregnancy which directly or indirectly might lead to immunological and nutritional stress in the buffalo infected with *T. evansi*.

The findings of the present study are not in confirmatory with the findings of Muraleedharan *et al.* (2005) [24], Sinha *et al.* (2006) [34], Jittapalpong *et al.* (2009) [16], Bhutto *et al.* (2010) [4] and Chaine *et al.* (2012) [5].

Conclusion

The overall prevalence of Trypanosomosis in buffaloes was recorded as (15.78%) 18/118 in and around Jabalpur. The age wise 5.55% upto < 2 years, 11.11% between 2-5 years and 32.14% > 5 years of age, sex wise 15.78% in female and 0% in male and parity wise 5.55% in zero parity, 9.09% in 1st parity, 25% in 2nd parity and 16% > in 3rd parity. Prevalence was obtained. However, the prevalence was recorded highest (32.14%) > 5 years of age and parity wise 25% in 2nd parity.

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