

Prevalence of Theileriosis in Buffaloes at Government and Private Farms in Tehsil Paharpur, Dera Ismail Khan

Arsalan Khan^{*1}, Muhammad Jamil², Amjad Ali³, Akhtar Ali³, Sagher Imdad³, Muhammad Zeeshan⁴, Saqib

Ali Rustam⁴, Hamza Maris⁴, Muhammad Mubeen⁴, Ghulam Jelani⁵

^{*1}Veterinary Research and Disease Investigation Center, Dera Ismail Khan-29050-Pakistan

² Pakistan Agriculture Research Council, Arid Zone Research Center, Dera Ismail Khan-29050-Pakistan

³Livestock Research and Development Station, Paharpur, Dera Ismail Khan-29050-Pakistan

⁴Faculty of Veterinary and Animal Sciences, Gomal University, Dera Ismail Khan-29050-Pakistan

⁵Faculty of Veterinary and Animal Sciences, Agriculture University, Dera Ismail Khan-29050-Pakistan

Corresponding Author: Dr. Arsalan Khan Email: drarsalankhandvm@gmail.com

ABSTRACT

Theileriosis in livestock is one of the major constraints to the development of livestock enterprise in Pakistan and in most parts of the world. The disease causing agent is transmitted by Ixodid ticks and has complicated life cycle. Prominent signs exhibited by cattle and buffaloes are; anorexia, pyrexia, enlarged lymph nodes (lymphadenitis), oculonasal discharges and diarrhea. The study was conducted to determine the prevalence of theileriosis in buffaloes in different government and private farms at Tehsil Paharpur of District Dera Ismail Khan. For this purpose, the animals belonged to different age and sex groups were screened and a total of 360 blood samples were collected from the buffaloes in which 3.33% overall prevalence was recorded. Prevalence at government and private farms was 0 and 4%, respectively. A higher infection rate was found in females (3.19%) as compared to males with 2.43% (Table 3). The observed infection rate among different age groups of buffaloes was Non-significant ($p < .05$) revealing 4.16% (3-4 years), followed by 3.29% (>4 years) and 1.78% (<2 years).

Key words: Prevalence; Buffaloes; theileriosis; Giemsa stain; Field stain.

INTRODUCTION

Livestock sector has a key role in the economy of Pakistan that contributes 56.3% to gross domestic product (GDP) in agriculture, while, in national GDP its share is 11.4% according to the economic survey of Pakistan, 2012-2013 (Saleem *et al.*, 2014). But livestock industry is prone to huge socio-economic losses by ticks infestation and protozoal infections (Saddiqi *et al.*, 2010).

Pakistan is found endemic for tropical theileriosis (East coast fever). The climate of tropical and subtropical regions favors incidence, growth and multiplication of ticks predisposing the animals to tick borne diseases (TBDs) and consequently declining dairy production (Sajid *et al.*, 2007). Certain Ixodid ticks such as *Hyalomma anatolicum anatolicum*, *H. m. marginatu* and *H. a. excavatum*, known to transmit *Theileria annulata*, are found in large numbers in the Mediterranean region, especially in semi-arid areas. Bovine theileriosis is caused by the protozoan parasite *Theileria annulata* and *Theileria parva* (Ogre, 1999).

Bovine *Theileria* species are intracellular parasites that cause severe and mild infections in their hosts. Clinical signs of the infected buffaloes include pyrexia (40.5– 41.5 °C), anorexia, enlargement of superficial lymph nodes (parotid, prescapular and prefemoral), diarrhea, dyspnoea, pale mucous membrane, slight nasal and ocular discharges with congestion of conjunctiva and salivation (Durrani *et al.* 2008). The diagnosis of theileriosis in acute cases is mainly based on clinical findings and microscopic examination of Giemsa's stained thin blood smear. However, in long standing carrier animals blood smears are negative on microscopy and thus can only be diagnosed using latest molecular techniques (Aktas *et al.* 2006).

As far as prevalence is concerned, various studies have been conducted to determine the prevalence of theileriosis in buffaloes in various areas of Pakistan and other tropical and subtropical regions of the world. In a study conducted in six districts of southern Punjab including Bhakar, Bahawalnagar, Layyah, Multan, Muzaffar Garh and Vehari, 144 blood samples were collected from large ruminants comprising of 39 buffaloes and 105 cows. It was seen that 3% samples were positive for *Theileria* using Giemsa staining technique and 19% using polymerase chain reaction (PCR) technique (Shahnawaz *et al.*, 2011). While, in another study carried out in district Lahore, 336

blood samples were tested from buffaloes and it was revealed that based on microscopic examination 39.9 (134/336) prevalence was recorded as compared to 53.3% (179/336) with PCR test (Durrani *et al.*, 2008).

Objectives

In Pakistan there is dire need for regular and continuous surveillance of the disease, identification of its associated risk factors and strategies for control and eradication of the protozoal diseases. However, this study was designed to determine the prevalence of theileriosis in buffaloes in government and private farms of buffaloes in Tehsil Paharpur, District Dera Ismail Khan.

MATERIALS AND METHODS

The current study was conducted at Livestock Research & Development Station (LR&DS) Paharpur, Dera Ismail Khan for the determination of the prevalence of theileriosis in buffalo populations in government and private buffalo farms in Tehsil Paharpur, District Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan. The study was conducted during the period of 02 years (2018-19 and 2019-20). For this purpose, a total of 360 blood samples were collected from buffaloes viz 60 from LR&DS Paharpur and 300 from surrounding areas of Tehsil Paharpur region of District D.I. Khan. Buffaloes of all age groups, sex and different farms at Tehsil Paharpur and its peripheral areas were selected and samples were collected from the animals randomly.

The blood samples were collected using standard protocol; *i.e.* blood was taken from ear veins preferably of buffaloes after disinfection with methylated spirit or alcohol. Buffaloes of different sex and all age groups were selected randomly from the different farms and the blood samples were collected and examined using Field and Giemsa staining techniques for the diagnosis of Theileria parasite (Benjamin, 1978). The clinico-epidemiological data of the animals was also collected. The prevalence of theileriosis in buffaloes was calculated using Thrusfield, (2007) formula, given below;

$$P = \frac{d}{n} \times 100$$

Where: P = Prevalence, d = No. of animals found positive, n = Total no. of animals selected for sampling.

The results obtained were statistically analyzed by chi square using Statistical Package for Social Services (SPSS) version 13.0 and p-value < 0.05 was considered statistically significant.

RESULTS & DISCUSSION

A total of 360 blood samples were collected from the buffaloes in government and private farms at Tehsil Paharpur, Dera Ismail Khan, including 41 males and 319 and samples were examined for detection of Theileria parasite. Out of total 360 samples, only 12 (3.33%) samples were found positive for Theileria species (Table 1). Similar study was conducted by Durrani *et al.* (2008) and reported 39.9% prevalence of theileriosis in buffaloes. The higher prevalence of theileriosis observed was due to sampling period because all blood samples were collected in June, July and August months in which the prevalence of hemeprotazoans is at peak. Our study was comparable to Maharana *et al.* (2016), who recorded 7.27% prevalence of theileriosis in buffaloes during monsoon season 7.27 % and similar study was conducted in buffaloes at Patna and Bihar using Giemsa staining technique and reported 9.33% prevalence of theileriosis (Kala *et al.*, 2018). A similar study was conducted by Khan *et al.* (2017) for the estimation of Theileria parasite in cows using Giemsa stain in District Dera Ismail Khan and revealed 14.32% prevalence. At government farm, LR&DS, Paharpur, no positive case was seen, while, the prevalence at private farms in the periphery of Paharpur was 4% (Table 2). A higher infection rate was found in females (3.19%) as compared to males with 2.43% (Table 3). The observed infection rate among different age groups of buffaloes was Non-significant (p<.05) revealing 4.16% (3-4 years), followed by 3.29% (>4 years) and 1.78% (<2 years) (Table 4). The smears were stained using Giemsa and Field stain simultaneously and both of the techniques showed 3.33% prevalence (Non-significant at p < .05) (Table 5).

CONCLUSION

It has been concluded from this study that the observed prevalence of theileriosis in buffaloes in Tehsil Paharpur, Dera Ismail Khan (3.33%) was less than the prevalence in cows (14.32%) in the same environment using the same technique (Giemsa staining) for diagnosis. However, the incidence of parasite was Non-significant in different age and sex groups. Moreover, further diagnosis at molecular level is necessary for estimation of prevalence of theileriosis in buffaloes.

Table 1. Overall Prevalence of theileriosis in Buffaloes in Paharpur district D.I. Khan, Pakistan.

Parasite	No. examined	No. infected	Prevalence (%)
Theileria	360	12	3.33

Table 2. Prevalence of theileriosis in Buffaloes at LR&DS, Paharpur and private farms in Tehsil Paharpur, Dera Ismail Khan

Parasite	No. of animals examined	Prevalence (%) at LR&DS, Paharpur	Prevalence (%) Private Farms, Paharpur
Theileria	360	0 (0/60)	4% (12/300)

Table 3. Prevalence of theileriosis among male and female Buffaloes in Paharpur district D.I. Khan, Pakistan.

Parasite	Male	Female	Total
Theileria	2.43% (01/41)	3.19% (11/319)	3.33% (12/360)

p – value = 0.8929(Non-Significant at p < .05)

Table 4. Prevalence of theileriosis in different age (years) groups of Buffaloes in Paharpur district D.I. Khan, Pakistan.

Parasite	<2	3-4	>4	Total
Theileria	1.78% (1/58)	4.16% (5/120)	3.29% (6/182)	3.33% (12/360)

p – value = 0.710(Non-Significant at p < .05)

Table 5. Comparative efficiency of Giemsa stain and field stain in diagnosis of Theileria in blood smear.

Parasite	Giemsa Stain	Field stain	Total
Theileria	3.33 (12/360)	3.33 (12/360)	3.33 (12/360)

p – value = 1 (Non-significant at p < .05)

LITERATURE CITED

1. Aktas, M., K. Altay and N. Dumanli, 2006. A molecular survey of bovine Theileria parasites among apparently healthy cattle and with a note on the distribution of ticks in eastern Turkey, Vet. Parasitol., 138 (3-4): 179 –185.
2. Benjamin, M.M., 1978. Outline of veterinary clinical pathology, 3rd Ed. The Iowa State Univ. Press, Ames, Iowa, USA.
3. Durrani, A.Z., A.R. Shakoory and N. Kamal, 2008. Bionomics of *Hyalomma* ticks in three districts of Punjab, Pakistan. J. Anim. Plant Sci., 18(1): 17-23.
4. Khan, A., K. Ashfaq, I. Din, R. Haq, M. Jamil, B. Ullah, S. Ullah and F. Ullah, 2017. Bovine

8. Theileriosis: Prevalence, Estimation of Hematological Profile and Chemotherapy in Cattle in Dera Ismail Khan, Khyber Pakhtunkhwa Province, Pakistan. Amer. Sci. Res. J. Engr. Tech. Sci., 32(1): 8-17.
9. Saddiqi, H.A., Z. Iqbal, M.N. Khan and G. Muhammad, 2010. Comparative resistance of sheep breeds to *Haemonchus contortus* in natural pasture infection. Intern. J. Agric. Biol., 12: 739-743.
10. Sajid, M.S., Z. Iqbal, M.N. Khan, G. Muhammad and M.U. Iqbal, 2007. Effect of *Hyalomma* ticks (*Acari: Ixodidae*) on milk production of dairy buffaloes (*Bos Bubalus bubalis*) of Punjab (Pakistan). Italian J. Anim. Sci., 6: 939-941.
11. Saleem, M.I., A. Tariq, A. Shazad and S.A. Mahfooz, 2014. Clinical, epidemiological and therapeutic studies on bovine tropical theileriosis in Faisalabad, Pakistan. Iraqi J. Vet. Sci., 28(2): 87-93.
12. Shahnawaz, S., M. Ali, M.A. Aslam, R. Fatima, Z.I. Chaudhry, M.U. Hassan, M. Ali and F. Iqbal, 2011. A study on the prevalence of a tick-transmitted pathogen, *Theileria annulata* and hematological profile of cattle from Southern Punjab (Pakistan). Parasitol. Res., 109: 1155-1160.
13. Thrusfield, M. 2007. Modelling. In: Veterinary epidemiology, 3rd Ed. Blackwell Science Ltd, Oxford, 340-356.
14. Kala, S., B.G. Deo and N. Kumari, 2018. Prevalence of Theileriosis in Buffaloes during Rainy Season in and Around Patna, Bihar. Int. J. Curr. Microbiol. App. Sci., 7(4): 2762-2766.
15. Maharana, B.R., B. Kumar, A. Prasad, T.K. Patbandhan, N.R. Sudhakar, J.P. Joseph and B.R. Patel, 2016. Prevalence and assessment of risk factors for haemoprotozoan infections in cattle and buffaloes of South – West Gujarat, India. Indian J. Anim. Res., 50(5): 733- 739.
16. Ogre, P.B., 1999. Assessment of natural Ixodid tick infestation. J. Vet. Med. 46: 405-419.