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

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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 are 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 hemiprotozoans 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>
<thead>
<tr>
<th>Parasite</th>
<th>No. examined</th>
<th>No. infected</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theileria</td>
<td>360</td>
<td>12</td>
<td>3.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parasite</th>
<th>No. of animals</th>
<th>Prevalence (%)</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>examined at LR&amp;DS, Paharpur</td>
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<td></td>
</tr>
<tr>
<td>Theileria</td>
<td>360</td>
<td>0 (0/60)</td>
<td>4% (12/300)</td>
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</table>

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theileria</td>
<td>2.43% (01/41)</td>
<td>3.19% (11/319)</td>
<td>3.33% (12/360)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parasite</th>
<th>&lt;2</th>
<th>3-4</th>
<th>&gt;4</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Theileria</td>
<td>1.78% (1/58)</td>
<td>4.16% (5/120)</td>
<td>3.29% (6/182)</td>
<td>3.33% (12/360)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Giemsa Stain</th>
<th>Field stain</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theileria</td>
<td>3.33 (12/360)</td>
<td>3.33 (12/360)</td>
<td>3.33 (12/360)</td>
</tr>
</tbody>
</table>

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

**LITERATURE CITED**