FIRST REPORT ON SEROPREVALENCE OF BLUETONGUE, BORDER DISEASE AND PESTE DES PETITS RUMINANTS VIRUS INFECTIONS IN SHEEP IN KYRGYZSTAN

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Received: 29-01-2014 Accepted: 08-05-2014

ABSTRACT

In this study, the presence of antibodies against Bluetongue Virus (BTV), Border Disease Virus (BDV) and Peste des Petits Ruminants virus (PPRV), were evaluated for the first time in Kyrgyzstan. A total of 655 serum samples were collected from healthy sheep (Jaydara breed) from different regions of Kyrgyzstan (144 from Issik Gol region, 208 from Narin region, 189 from Talas region and 114 from Çuy region). Commercially available competitive ELISA kits were used to detect antibodies against tested samples. Seroprevalence was found to be 36.94%, 7.32% and 35.11% against BTV, BDV and PPRV infections, respectively. Significant differences in antibody prevalences were found among both BTV-BDV and BDV-PPRV groups (P<0.001) only. This is the first report on seroprevalence of viral infections for BTV, BDV and PPRV in the Jaydara breed of sheep within Kyrgyzstan.

Key words: Jaydara breed sheep, Bluetongue, Border disease, Peste des Petits Ruminants.

INTRODUCTION

Bluetongue virus (BTV), Border Disease virus (BDV) and Peste des Petits Ruminants virus (PPRV) infections are so common all over the world and cause a great deal of economical loss in sheep raising sector. BTV is a viral infection, usually transmitted by Culicoides flies in sheep, goats and cattle. In the disease, animals display fever, respiratory distress, facial oedema, lameness, oral ulceration and haemorrhage. BTV infections are commonly formed in regions with tropical and subtropical climate where ruminant population is dense (Duman et al. 2009). BDV is a congenital infection in sheep (Julia et al. 2009). Female pregnant sheep with the disease display abortion, stillbirth, infertility and abnormal birth of lamb. Transmission of virus from the infected mother to the lamb and presence of persistent infected animals in the herd make up the main source of the infection (Orsel et al. 2009). PPR is an acute, highly contagious infectious disease of small domestic and wild ruminants (Nussieba et al. 2009). Disease is widely prevalent in sheep and goats located in the Middle East, the Arabian Peninsula, and Southern Asia and Africa continents resulting in economical losses to livestock owners (Saed et al. 2010). This disease usually occurred in outbreak form in small ruminants with more morbidity, mortality and case fatality rates in kids and lambs as compare to adults (Sharma et al. 2007).

Present study was carried out to explore the seroprevalence of above viral infections within the Jaydara breed of sheep located in the northern part of Kyrgyzstan. Jaydara breed was introduced into the territory of the country by the methods of national selection and breeding programme and contribute to the national economy by giving meat, fat (especially tail) and rough wool. In Kyrgyzstan, no previous study has been undertaken related to prevalence of these viral
infections and their economical impact. Keeping in view the importance of viral infections of small ruminants in the region, the study has been envisaged to explore the serological status of different viral infections in sheep of the Jaydara breed within the region. To our knowledge, this is the first report on seroprevalence of viral infections for BTV, BDV and PPRV of sheep in Kyrgyzstan.

MATERIALS AND METHODS

Animals: Samples were collected from different age groups of Jaydara breed sheep. Average weight of ewes was 56-58 kg, rams: 75-85 kg and lambs: 28-30 kg. Wool of this breed is black coloured, coarse and wool clipping is 0.8-1.2 kg. Under fatten sheep gives up to 60% of reproduction. The litter is 85-90 lambs on 100 dams.

Sample collection: Blood samples were collected from 655 Jaydara sheep of various ages (1-2 year olds) and race which were raised in the highlands and owned by the public in Çuy (42° 25' 00' N/ 74° 30' 00' E), Narin (41° 25' 43' N/ 75° 59' 28' E), Talas (42° 19' 60' N/ 72° 0' 00' E) and Issik Gol (42° 00' 00' N/ 78° 0' 00' E) regions. Blood samples were collected in 10 ml tubes without adding any anticoagulant, cold chain was maintained during transportation to laboratory. Serum was separated from each sample after centrifugation for 20 minutes at 2000 rpm and kept at -80°C until testing.

RESULTS AND DISCUSSION

ELISA tests: In this study, commercial ELISA testing kits (Bluetongue Virus Antibody Test Kit; Border Disease Virus Antibody Test Kit; PPR Competition Antibody Test Kit) were used in order to detect antibodies against BTV, BDV and PPRV in collected serum samples. Testing applications were done and evaluated as per manufacturer’s instructions. Data was statistically analysed by the chi-square test (SPSS 15.0 Inc).

In the present study, 242 (36.94%) samples out of 655 were found positive for antibody against BTV. Seropositivity rate of BTV infection according to regions was lowest in Çuy (1.75%) and highest in Talas (51.32%) regions (Table 1). In a study in Western Azerbaijan and Iran, Jafari Shoorijeh et al. (2010) tested 1153 sheep blood serum samples in terms of BTV antibodies and reported 400 (34.7%) positive for antibodies to BTV. Di Ventura et al. (2004) evaluated seroprevalence of BTV in sheep and goats in Albania. A total of 870 serum samples were examined and seroprevalence was found to be 4.4% by ELISA. Lundervold et al. (2004) collected blood samples from various animals to evaluate presence of antibodies of different microbial and viral infections of ruminants in Kazakhstan. They tested a total of 542 sheep serum samples for antibodies against BTV with ELISA. Results of their study indicated a seroprevalence of 21.4%.

A total of 230 (35.11%) serum samples out of 655 tested were detected positive for PPRV antibodies. PPRV infection was found to be lowest in Çuy (7.01%) and highest in Talas (51.32%) region (Table 1). A survey investigation confirmed presence of PPRV in southern Tanzania by RT-PCR and serological analysis revealed that seroprevalence was 31% (Muse et al. 2012). In a study in the eastern part of Turkey, Tutuncu et al. (2011) tested a total of 465 sheep serum in terms of antibodies against pestivirus and detected 353 (75.9%) of them as seropositive. In a study in the northern part of Turkey, Yazici et al. (2012) tested 401 sheep serum samples in terms of antibodies against pestivirus with ELISA and Serum Neutralisation (SN) and they detected the seropositivity rate between 7.22 - 74.38% with ELISA while it was between 4.81 - 67.76% with SN. Results of ELISA against BDV antibodies indicated 48 (7.32%) animals positive, however seropositivity rate of BDV infection according to region could not be determined in Issik Gol and Talas while it was the highest in Narin region (22.11%) (Table 1). In the study, antibody prevalences were found to be significant among both BTV-BDV

<table>
<thead>
<tr>
<th>Regions</th>
<th>Numbers</th>
<th>BTV +</th>
<th>BTV %</th>
<th>BDV +</th>
<th>BDV %</th>
<th>PPRV +</th>
<th>PPRV %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Çuy</td>
<td>114</td>
<td>2</td>
<td>1.75</td>
<td>2</td>
<td>1.75</td>
<td>8</td>
<td>7.01</td>
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<td>Issik Gol</td>
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<td>47</td>
<td>32.63</td>
<td>0</td>
<td>0</td>
<td>65</td>
<td>45.13</td>
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<tr>
<td>Narin</td>
<td>208</td>
<td>96</td>
<td>46.15</td>
<td>46</td>
<td>22.11</td>
<td>35</td>
<td>16.82</td>
</tr>
<tr>
<td>Talas</td>
<td>189</td>
<td>97</td>
<td>51.32</td>
<td>0</td>
<td>0</td>
<td>122</td>
<td>64.55</td>
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<tr>
<td>Total</td>
<td>655</td>
<td>242</td>
<td>36.94</td>
<td>48</td>
<td>7.32</td>
<td>230</td>
<td>35.11</td>
</tr>
</tbody>
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TABLE 1: Seroprevalence of viral infections in sheep of different regions of Kyrgyzstan.
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P = 0.000, P < 0.001) and BDV-PPRV groups (P = 0.000, P < 0.001). In contrast, no significant differences in antibody prevalence were found between BTV-PPRV groups (P = 0.490, P < 0.05, Not significant).

Kyrgyzstan is a mountainous country with the Tanrý Mountains covering 65% of the country; that’s why the country is also called “Switzerland of Middle East”. Almost 90% of the country has an altitude of over 1500 meters. In Northern Kyrgyzstan Region where the study was performed, winter climate conditions are extremely harsh. Malnutrition of animals, insufficient care, unsuitable barn and shelter conditions and animal diseases are important factors causing breeding and fertility loss in stockbreeding (World Bank 2004). Not using quality forage to enable fine nutrition of animals in harsh winter conditions causes many animals to get weak. This condition increases the risk for infection and disease and causes death (Gultekin 2008). It is not possible to say that stockbreeding is performed using scientific methodology and modern technology in Kyrgyzstan. Stockbreeding is commonly performed by traditional methods either in family enterprises owned by the public or in company enterprises. On the other hand, because of limited resources reserved by the state for the sector, advances have not been made against combating infectious diseases and researching rehabilitating methods. So infectious diseases are commonly seen (World Bank 2004). In this study, the seroprevalence has been found quite low for three viral diseases of sheep in Çuy province. It is thought that is because of low Culicoides population in the province, being located in Northwest of Kyrgyzstan, having a cold and long dry season and the hygienic practices in herds of the region. Issik Gol and Talas are located in East and West of Kyrgyzstan. The seroprevalence of BTV and PPRV in herds of these two regions was found to be potentially high. The same is may be due to the high levels of Culicoides population brought on by the high amounts of regional precipitation and resulting large-scale wetlands. Narin is the largest province of Kyrgyzstan. It is located in the East of the country. It’s economy is dominated by sheep herding as wool and meat as the main products. Three viral diseases have been detected in this province. We assumed that it is caused by large animal population and a lot of animal movements in the province.

This is first report on seroprevalence of viral infections of Jaydara breed sheep in Kyrgyzstan. Results of study revealed a higher seroprevalence of BTV and PPRV infections as compared to BDV.

REFERENCES


