In this study, bovine coronavirus (BCV) and bovine rotavirus (BRV) seroprevalences were detected by ELISA in 107 goat blood serum samples obtained from five different provinces of Northern Turkey. The results of the study reflected 41.12% and 82.24% seropositivity against BCV and BRV, respectively, in the goat sera.

BCV seroprevalence in mature goats is determined for the first time with this study. Furthermore, this is the first statement of BRV and BCV seroprevalences in the mature goat population in Turkey.

Key words: BRV, BCV, ELISA, goat, seroprevalence

Introduction / Uvod

Various studies around the world have reported that antigen against Bovine rotavirus (BRV) had been detected in young goat’s gaita specimen [3, 4, 5, 6]. In addition, Sato et al. [7], reported neutralising antibodies presence in goat blood sera against BRV.

The bovine coronavirus (BCV), is an important cause of diarrhoea and is detected in feces of adult cattle with winter dysentery [1, 8]. Eisa et al. [2], detected BCV antigen in young goat’s gaita. However, Sevinç et al.(2005) and Muñoz et al. [6], could not determine BCV antigen by ELISA in young goats.

Establishing BCV seroprevalence in mature goats is the aim of this study. Furthermore, data that will be obtained during the study will present the BRV and BCV seroprevalence in a mature goat population in Turkey for the first time.
Sera samples / Uzorci seruma: In this study, goat blood sera specimen were collected from 107 healthy looking, ≥1 year-old mature goats non-vaccinated against BRV and BCV, from five different provinces in Northern Turkey. Sera were separated from the collected blood specimens, inactivated at 56°C for 30 minutes and stored at -20°C until use in the test procedure.

Enzyme Linked Immunosorbent Assay (ELISA) / ELISA test: Competitive-ELISA commercial test kits were used for BRV and BCV serodiagnosis of the animals tested (Rotavirus Elisa Kit Cat.Nr.Bio K 126 and Coronavirus Elisa Kit, Cat Nr.Bio K 127, Bio-X Diagnostics, Jemelle-Belgium). Tests were performed according to the manufacturer’s recommendations. At the end of the tests, optical densities were measured with an ELISA reader (Daf, Italy) at 450 nm absorbance according to the instructions in the test procedure.

The mean optical densities of the positive and negative sera (OD pos and OD neg) and those of all the samples (OD samples) were calculated. For each tested sample and the positive serum, the percent inhibition was calculated (%inhib) by means of the following formulas:

\[
\% \text{ inhibition of sample} = \frac{(\text{OD} \text{neg} - \text{OD} \text{sample})}{\text{OD} \text{neg}} \times 100 \\
\% \text{ inhibition of positive} = \frac{(\text{OD} \text{neg} - \text{OD} \text{pos})}{\text{OD} \text{neg}} \times 100
\]

The results of the ELISA tests of goat blood sera revealed 41.12 % (44/107) and 82.24 % seropositivity against BCV and BRV. These data indicate that BRV infections are more frequently encountered compared to BCV infections in goats in the examined areas of Turkey. Distribution of the results according to the provinces are demonstrated in Table 1.

Table 1. Distribution of goat blood sera according to the provinces / Tabela 1. Raspored seruma krvi koza prema provincijama

<table>
<thead>
<tr>
<th>Province where goat blood sera were obtained / Provincije iz kojih su dobijeni serumi krvi koza</th>
<th>Specimen number / Broj uzorka</th>
<th>Bovine coronavirus / Bovini koronavirus</th>
<th>Bovine rotavirus / Bovini rotavirus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bafra / Bafra (I)</td>
<td>20</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Tekkeköy / Tekkej (II)</td>
<td>16</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Amasya / Amasija (III)</td>
<td>51</td>
<td>37</td>
<td>72.5</td>
</tr>
<tr>
<td>Samsun / Samsun (IV)</td>
<td>10</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Çorum / Čorum (V)</td>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Total / Ukupno</td>
<td>107</td>
<td>44</td>
<td>41.12</td>
</tr>
</tbody>
</table>
According to our results, major bovine coronavirus positivity was determined 72.5% in the third province, while major positivity for bovine rotavirus was recorded for regions III, IV and V, with rates of 98.03%, 90%, and 100%, respectively. These results are the first data demonstrating the rotavirus and coronavirus frequency in goats in Turkey.

Considering that BRV infections create epidemics in newborns, the probable source of the widespread BRV antibody positivity (82.24%) obtained at the end of the study may be suggested as a BRV infection the goats had experienced when they were newborn. In addition, because it is demonstrated that BRV were more widespread in provinces III, IV and V compared to the rest, when the five provinces were separately evaluated at the end of the study, it is concluded that BRV constitutes regional epidemics in Turkey. Since BRV are cattle infections, BRV antibodies determined in the study are accepted as proof of the spreading of the infection from cattle to goat. Proceeding from these data, the spreading of infection from infected goat to cattle must be considered, and goats must be investigated in detail as a possible source in BRV epidemics.

BCV antibody positivity determined in quite high rates (41.12%) at the end of the examinations may be an indicator of either a coronavirus diarrhea the goats had experienced in the newborn period, or a BCV infection (winter dysentery) they suffered when they were adults. The rare isolation of BCV antigen in young goats in the previous studies suggests that this infection is not common in young goats. This data strengthens the possibility that the goats had experienced the infection when they were adults. It is a known fact that BCV infections cause winter dysentery in adult cattle. Since BCV are cattle infections, BCV antibodies determined in the study are accepted as proof of the spreading of the infection from cattle to goat. Proceeding from this point, it is possible that BCV infections may also cause winter dysentery in adult goats, due to BCV. The role of mature goats in winter dysentery cases needs further detailed investigations. Besides, a significant advance in province III was detected as a result of the comparative BCV prevalence evaluation in the five provinces in which the study was carried out. This result indicates that BCV infections exist as regional epidemics in Turkey.

In conclusion, with this study BCV prevalence in adult goats is determined for the first time, and it is suggested that it may play a role in a goat winter dysentery epidemic. Furthermore, important epidemiological information was secured on the distribution and infection spectrum of BCV and BRV infections in Turkey by the investigation of BCV and BRV antibodies in adult goat population.
References / Literatura

из 107 коз из пяти различных провинций в северной Турции. Полученные результаты представляют собой 41,12% сероположительности против БКВ и 82,24% сероположительности против БРВ. Это испытание представляет собой первое определение серопреваленц для БКВ у зрелых коз. Кроме того, это первое извещение о серопреваленце БРВ и БКВ в популяции зрелых коз в Турции.

Ключевые слова: БРВ, БКВ, ELISA, коза, серопреваленц