

## Seroprevalence of Bluetongue Disease in the Cattle in Siirt Province, Turkey

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**Abstract:** Bluetongue is a viral disease of domestic and wild ruminants transmitted via the biting flies. The agent is in the *Orbivirus* genus of the *Reoviridae* family and has 24 known serotypes. The disease is most common during the summer months and is more severe during humid and rainy times. The aim of this study is to determine the presence of bluetongue infection serologically in cattle in Siirt province, Turkey, and to get information about its prevalence in the region. The material of the study consisted of a total of 279 cattle reared in different localities of Siirt. For laboratory analysis, 5 ml blood samples were taken from jugular vein of cattle and put into non-anticoagulant tubes. The samples were centrifuged at 3000 rpm for 10 minutes and serum was transferred into Eppendorf tubes and stored at -20 °C until enzyme-linked immunosorbent assay (ELISA) analysis was performed. Serum samples were analyzed by an ELISA device (Multiskan GO, Thermo Scientific) using the commercial test kit (Bluetongue Virus VP7 Ab Test Kit, IDEXX). The results were evaluated as positive and negative. Of the 279 specimens analyzed, 150 (53.76%) were found to be seropositive and 129 (46.24%) were seronegative. As a result, in addition to measures for quarantine and vector control in the fight against the disease, it was concluded that vaccines specific to virus serotypes should be used and comprehensive and planned studies should be carried out in the region and across the country.

**Keywords:** Cattle, Bluetongue, ELISA, Siirt, Turkey.

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### I. Introduction

Bluetongue is a viral disease of domestic and wild ruminants transmitted via the biting flies. The agent is in the *Orbivirus* genus of the *Reoviridae* family and has 24 known serotypes<sup>1,2,3,4,5</sup>. The disease is most common during the summer months and is more severe during humid and rainy times<sup>6</sup>. Bluetongue disease was first seen in sheep in South Africa in 1800. It is reported in cattle firstly between 1889 and 1904 with the name "Mycotic Stomatitis"<sup>7</sup>. The disease can be transmitted with spermatozoa, vertically, but it is mainly spread by *Culicoides* type flies. It has been suggested, so far, that 17 of the *Culicoides* genus have taken the vector role of bluetongue infection and that climatic changes are also an important factor in the spread of the disease<sup>6,8,9</sup>.

The geographic conditions where *Culicoides* are most active are tropical and subtropical regions between 40-50 degrees north and 35 degrees southern latitudes<sup>2,10,11</sup>. There is not enough research on the seasonal distribution of the *Culicoides* species' activities in Turkey. In a study conducted in the Konya region, 19 different *Culicoides* spp. were detected and it was reported that their activities continued between April-October and peaked during the July-September period<sup>12</sup>. The disease is clinically seen especially in sheep<sup>10</sup>, while in cattle, it is subclinical. Because the viremia phase lasts approximately 100 days, cattle are considered to be the most important reservoir of the disease<sup>10,13</sup>. Severe and wide ulceration in the oral mucosa and the udder, mucohemorrhagic nasal discharge, epiphora, and periorcular inflammation can be seen in cattle<sup>14</sup>. Serious degrees of pulmonary edema may also develop in highly affected cattle as well<sup>15</sup>.

The aim of this study is to determine the presence of bluetongue infection serologically in cattle in Siirt province, Turkey, and to get information about its prevalence in the region.

### II. Material and Methods

#### Study area

The Siirt province is in the subhumid climate zone (C, B'3, s2, b'2) according to the Thorntwaite Climate Classification. The annual precipitation in the province is 715.4 mm. The average temperature is between 36.9 °C and 18.9 °C in summer, and 8.7 °C and -0.5 °C in winter. There are frequent water shortages during the summer<sup>16</sup>.

**Animal material**

The material of the study consisted of a total of 279 cattle raised in different localities of Siirt. For laboratory analysis, 5 ml blood samples were taken from jugular vein of cattle and put into non-anticoagulant tubes. The samples were centrifuged at 3000 rpm for 10 minutes and serum was transferred into Eppendorf tubes and stored at -20 °C until ELISA analysis was performed.

**Test Procedure**

Serum samples were analyzed by an ELISA device (Multiskan GO, Thermo Scientific) using the commercial test kit (Bluetongue Virus VP7 Ab Test Kit, IDEXX). The results were evaluated as positive and negative.

**Ethical approval**

Ethical approval for this study was obtained from the Local Ethics Committee for Animal Experiments (DEHAM) of Siirt University with the approval number 2018/12.

**III. Result**

During the clinical examination of the study, no clinical findings were found. In recent studies, clinical symptoms were not observed even in herds with high antibody ratios, and most of the epidemics in the world were reported to be subclinical<sup>17</sup>. Of the 279 specimens analyzed, 150 (53.76%) were determined to be seropositive and 129 (46.24%) to be seronegative.

**Table 1.** Seroprevalence of bluetongue disease in cattle in Siirt.

Examined No.		Positive		Negative	
Species	n	n	%	n	%
Cattle	279	150	53.76	129	46.24

**IV. Discussion**

The prevalence of disease in cattle in Kazakhstan, Saudi Arabia, India, China, and Jakarta are reported to be 25.40, 44.80, 70, 13.30, and 57.50%, respectively in various studies done in these regions<sup>18,19,20,21,22</sup>. Since vectors are able to survive in the winter months thanks to global warming, the disease has spread in the European continent to the north and has emerged as a significant problem in Switzerland and Scandinavia after January 2007 in sensitive animal populations<sup>23,24</sup>.

Several studies have been conducted to determine the prevalence of bluetongue disease in cattle in Turkey<sup>3,4,5,10,25,26</sup>. When the disease first appeared in Turkey, a high mortality was reported<sup>25,26</sup>.

In a study conducted in the provinces of Adiyaman, Batman, Diyarbakir, Gaziantep, Mardin, Kilis, Siirt, Sanliurfa, and Sirnak in the region covered by the Southeastern Anatolia Project by Özgünlük (2003), seroprevalence of bluetongue in cattle were determined as 29.33, 75.21, 63.83, 64.52, 51.76, 27.54, 43.66, 66.67, and 22.39%, respectively.

Yıldırım et al. (2005) reported that the prevalence of the disease is 48.02% in the study of the bluetongue seroprevalence in cattle in the Northeast Anatolia region. Meanwhile, Gür (2008) found in a study conducted in Ceylanpinar that the seroprevalence of the disease is 88%. Yilmaz et al. (2012) determined the seroprevalence of the disease as 18.5% in their study conducted in the Kars area with Competitive ELISA (c-ELISA) method. Furthermore, Kulaç et al. (2016) reported that the seroprevalence of the disease in cattle is 25% in their research done in Rize province. Simsek et al. (2017) found in a study conducted in Diyarbakir that the seroprevalence of the disease in cattle is 17.43%. The fact that in the clinical examinations of 279 cattle, which were the material of this study, no symptoms were found is similar to the result of Mellor (1994). Moreover, the seropositivity detected in the current study was consistent with the studies of other researchers<sup>4,25,26</sup>.

There is not enough research on the seasonal distribution of the *Culicoides* species' activities in Turkey. In a study conducted in the Konya region, 19 different *Culicoides spp.* were detected and it was reported that their activities continued between April-October and peaked during the July-September period. It was reported that the optimum temperature for activation of the *Culicoides* is 13-24 °C and for the complex members it may be up to 35 °C, while below 9-10 °C *Culicoides* do not fly<sup>12</sup>. In the region, the breeders are wintering their animals especially in the Mardin and Sanliurfa regions, and with the warming of the weather, they are grazing in the plateaus in the Van, Agri, and Erzurum regions. In the spring and autumn periods, when the weather is warming or cooling, the animals are taken from highlands to the winter quarters, or from winter quarters to highlands. In this study, the reason for bluetongue infection was high may be due to that

Siirt province has a suitable climate for activities of the *Culicoides* spp and the intense animal movements in the spring and autumn seasons.

## V. Conclusion

Considering the study data, in addition to measures for quarantine and vector control in combating the disease, it was concluded that vaccines specific to virus serotypes should be used and comprehensive and planned studies should be carried out in the region and across the country.

## Acknowledgment

The study was orally presented in the V. International Multidisciplinary Congress of Eurasia (IMCOFE), July 24-26, 2018, Barcelona, Spain.

## Conflicts of interest

There are no conflicts of interest.

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