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Determination of the Prevalence of Bluetongue Disease in Goats in Siirt Province by the ELISA Method

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***Abstract*—** *Bluetongue disease is a disease caused by the bluetongue virus in the Orbivirus genus of the Reoviridae family. The disease can be transmitted by ticks, sperm and vertically but is mainly spread by the Culicoides type flies. While the disease is naturally observed in cattle and sheep, it is more rarely observed in goats. This study was carried out to determine the presence of bluetongue infection in goats raised in Siirt province serologically and to obtain information about its prevalence in the region. The material of the study consisted of a total of 372 goats over one year of age raised in Siirt province. For laboratory analyses, 5 ml blood samples were taken from the jugular vein of goats to tubes without anticoagulant. The samples were centrifuged at 3000 rpm for 10 minutes, and the sera were transferred to Eppendorf tubes and stored at -20 °C until analysis. The serum samples were analyzed by the ELISA (Thermo Scientific Multiskan Go) method using the commercial test kit (Bluetongue Virus VP7 Ab Test Kit, IDEXX). The results were evaluated as positive and negative. Of the 372 goats constituting the material of the study, 252 (67.74%) were seropositive and 120 (32.26%) 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 relation to the disease in the region and the country.*

Keywords*— *Bluetongue, ELISA, Goat, Siirt, Turkey

I. INTRODUCTION

Bluetongue disease that infects domestic and wild ruminants was first observed in Africa in the early 19th century (Gizaw *et al*., 2016; Luo *et al*., 2017). Bluetongue disease is a disease caused by the bluetongue virus in the *Orbivirus* genus of the *Reoviridae* family (Bulut *et al*., 2006; Mulabbi *et al*., 2013; Mahmoud and Khafagi, 2014; Mozaffari *et al*., 2014). The disease can be transmitted by ticks, sperm and vertically but is mainly spread by species of the genus *Culicoides*, family Ceratopogonidae. The most active geographical conditions for *Culicoides* are tropical and subtropical regions between 40-50 degrees north latitudes and 35 degrees south latitudes (Mellor and Wittmann, 2002; García *et al*., 2009; Mozaffari *et al*., 2014; Yilmaz *et al*., 2015; Kulaç *et al*., 2016).

While the disease is naturally observed in cattle and sheep, it is more rarely observed in goats (Mozaffari *et al*., 2014; Nongdhar *et al*., 2017). Clinical findings are observed especially in sheep. High morbidity and low mortality are observed in sheep (Saltık and Kale, 2017). The disease is subclinical in cattle and goats. For this reason, cattle and goats serve as reservoirs for other animals (Darpel *et al*., 2009; De *et al*., 2009; Kulaç *et al*., 2016). Cyanosis occurs in the mouth lesions of severely infected animals, and the appearance of the dark blue tongue is the characteristic finding of the disease (Saltık and Kale, 2017). In Siirt province, there are over a million small ruminants and livestock husbandry is one of the most important means of living in the province. In terms of the goat population, Siirt province ranks 4th in Turkey with 480.638 goats (TUIK, 2017). This study was carried out to determine the presence of bluetongue infection in goats raised in Siirt province serologically and to obtain information about its prevalence in the region.

II. MATERIALS AND METHODS

Study Area:

Siirt province (figure 1) lies in the sub-humid climate region according to the Thorntwaite Climate Classification (C2, B'3,s2,b'2). The annual precipitation in the province is 715.4 mm. The average highest and lowest temperatures are 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 (Meteoroloji, 2018).

Animal material:

The material of the study consisted of a total of 372 goats over one year of age raised in Siirt province. For laboratory analyses, 5 ml blood samples were taken from the jugular vein of goats to tubes without anticoagulant. The samples were centrifuged at 3000 rpm for 10 minutes,

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and the sera were transferred to Eppendorf tubes and stored at -20 °C until analysis.

Test Procedure:

The serum samples were analyzed by the ELISA (Thermo Scientific Multiskan Go) method 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 Siirt University Local Ethics Committee For Animal Experiments (DEHAM) (Approval Numer: 2018/14).

III. RESULTS

Of the 372 goats constituting the material of the study, 252 (67.74%) were seropositive and 120 (32.26%) were seronegative.

Table 1. Seroprevalence of bluetongue disease in Goats in Siirt Province.

Examined No.		Positive		Negative	
Species	n	n	%	n	%
Goat	372	252	67.74	120	32.26

IV. DISCUSSION

In the studies on goats in the world, the prevalence of bluetongue in Uganda, Iran, China, India, Albania, Egypt, and Ethiopia was reported as 90.00%, 67.70%, 13.31%, 47.00%, 4.40%, 14.70%, 60.53%, respectively (Di Ventura *et al*., 2004; De *et al*., 2009; Mulabbi *et al*., 2013; Mahmoud and Khafagi, 2014; Mozaffari *et al*., 2014; Gizaw *et al*., 2016; Luo *et al*., 2017).

In a limited number of studies conducted to determine the prevalence of bluetongue on goats raised in Turkey; In the study of Bulut *et al*. (2006) conducted in Konya and Burdur, it was reported that the seroprevalence of the disease in goats was 60.00% and 60.00%, respectively. In the study of Ozan *et al*. (2012) conducted in Samsun, it was reported that the seroprevalence of the disease in goats was 4.00%. In the study of Yeşilbağ *et al*. (2011) conducted in zoos, it was reported that the seroprevalence of the disease was 1.80%. In the study of Alpay *et al*. (2014) conducted in Gökçeada, it was reported that the seroprevalence of the disease was 6.60%. Seropositivity obtained as a result of this study is similar to the findings of Bulut *et al*. (2006).

There is a limited number of studies on *Culicoides spp*. in our country. In a study carried out, it was reported that *Culicoides spp*. activities continued between April and October and peaked in July-September. The optimum temperature for the activation of *Culicoides* was reported to be 13–24 °C, and for *C.nubeculosus* complex members it was reported to be up to 35 °C (Uslu and Dik, 2004).

In the region, the breeders wintering their animals especially in Mardin and Şanlıurfa regions, and with the warmer weather, they graze them in the highlands in Van, Ağrı, and Erzurum regions. In the spring and autumn periods, when the weather warms or cools, animals are taken from highlands to wintering lands, or from winterizing lands to highlands. In this study, the reason for the high bluetongue infection may be due to the fact that Siirt province has a suitable climate for *Clucoides spp*. activities and that animal movements are intense in spring and autumn.

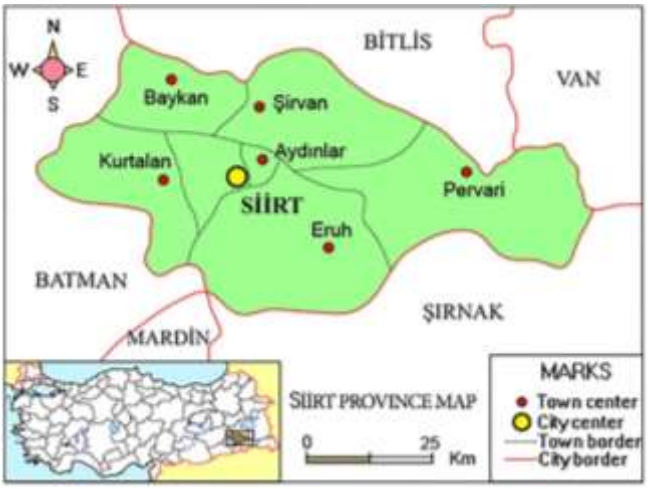

Fig. 1: Siirt province map in which the study was performed (Saygılı, 2015).

V. CONCLUSION

Considering the study data, 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 relation to the disease in the region and the country.

CONFLICTS OF İNTEREST

There are no conflicts of interest.

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