

# Detection of *Babesia (Theileria) equi* (Laveran, 1901) in Horses in the Kars Province of Turkey

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**SUMMARY:** This study was carried out in order to detect antibodies to *Babesia (Theileria) equi* in the local breed of horses in the province of Kars, Turkey. A total of 108 serum samples from apparently healthy horses in eight villages were examined for *B. equi* antibodies by an indirect immunofluorescent antibody test (IFAT). Of the 108 samples tested, 27 (25%) were found to be seropositive. The horses sampled in Aydıncalan village had the highest prevalence (50.0%) of *Babesia equi* infection while the lowest prevalence was found among horses from Bayraktar village (12.5%). Statistically significant differences in seroprevalence were observed between these two villages ( $P < 0.05$ ). This study is the first report on the status of *B. equi* infection in Kars.

**Key Words:** *Babesia equi*, seroprevalence, IFAT, Kars

## Kars Yöresinde Atlarda *Babesia (Theileria) equi*'nin (Laveran, 1901) Seropozitifliği

**ÖZET:** Bu çalışma, Kars yöresinde halk elinde yetiştirilen yerli ırk atlarda *Babesia (Theileria) equi*'nin seroprevalansını saptamak amacıyla yapılmıştır. Kars merkeze bağlı 8 köyde klinik olarak sağlıklı 108 attan kan alınmıştır. Elde edilen serum örnekleri *B. equi* antikorları yönünden indirekt floresan antikor (IFA) testi ile taranmıştır. İncelenen 108 atın 27'sinde (%25) *B. equi*'ye karşı antikor tesbit edilmiştir. Araştırmanın yapıldığı köyler dikkate alındığında en yüksek seroprevalansın %50 ile Aydıncalan köyünde, en düşük seroprevalansın ise %12,5 ile Bayraktar köyünde olduğu saptanmıştır. Bu iki köyde atlarda belirlenen seroprevalans değerleri arasındaki fark istatistikî yönden önemli bulunmuştur ( $P < 0,05$ ). Çalışma, Kars yöresi atlarında *B. equi*'nin durumuna ilişkin ilk rapordur.

**Anahtar Sözcükler:** *Babesia equi*, Seroprevalans, IFAT, Kars

## INTRODUCTION

*Babesia equi* is a tick-borne hemoprotozoan parasite which causes equine babesiosis (8). The disease is endemic in most tropical and subtropical regions of the world, including Europe, Asia, Africa, America and Australia continents (12). The diseased animal is characterized by anemia, fever, hemoglobinuria, icterus and in some cases death can occur (16). Although acute at times, equine babesiosis may also be chronic and sub-clinical, where the infected animal can aid in transmission of the organisms. Subclinical infection from which the diseased state arises may negatively affect the animal's performance (6).

For diagnosis of equine babesiosis, direct microscopic identification

of the parasite in stained blood films is confirmatory, but it is usually difficult to find the organisms in blood smears of carrier animals. Thus, for epidemiological studies, a serological test is preferred (11).

A few studies have been published regarding the distribution of equine babesiosis in Turkey (1, 9, 10). These studies routinely utilized microscopic examination of blood smears. Recently, IFAT has been reported to be used for the same purpose (3). The aim of the present study was to determine the prevalence of *B. equi* in the province of Kars by an indirect immunofluorescent antibody test (IFAT).

## MATERIALS AND METHODS

A total of 108 sera were collected from horses in eight villages at north, south, east and west of the Kars. The province of Kars is located in north-eastern Turkey and has the largest horse population. Information on the location and general health of the animals was also recorded. The age range was from three to seven years. Serum samples were transported to

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the Parasitology Laboratory of the Faculty of Veterinary Medicine, Kafkas University, Kars and stored at  $-20^{\circ}\text{C}$  in a freezer until analysis. They were tested for *B. equi* antibodies using an indirect fluorescence immunoassay (IFA) IgG antibody kit (Fuller Laboratories, Fullerton, USA) in the Parasitology Laboratory of Pendik Veterinary Control and Research Institute. The *B. equi* IFA IgG antibody kit is intended for the detection of IgG class horse antibody against *B. equi*. Procedures taking place in test prospectus were applied completely. A positive reaction appears as peripheral clusters of distinct apple-green inclusion bodies within the infected erythrocytes. The size, appearance and density of the reaction must be compared with the positive and negative reactions. An antibody titre of 1:80 and over was accepted to be positive (13). Statistical analysis was performed according to the Petrie and Waston (14). Results were analyzed statistically using the Chi-square test for significance in the present study.

## RESULTS

Serological results of tested horses for *B. equi* are shown in the Table 1. Of the 108 horse serum samples, 27 (25%) were detected positive to have antibodies to *B. equi* by the IFAT. Antibodies to *B. equi* were detected in all 8 villages sampled. The highest seroprevalence was observed in Aynalalan village (50%), while the lowest seropositivity was found in Bayraktar village (12.5%). Seroprevalence of *B. equi* was significantly difference according to the percentage of seropositive horse present in two villages ( $P < 0.05$ ).

**Table 1.** The prevalence of serum antibodies to *B. equi* in the horses of Kars province

Villages	No of serum samples	No of positives	Seropositive rate %
Aynalalan	12	6	50
Bayraktar	16	2	12.5
Bekler	10	4	40
Çağlayan	22	4	18.8
Çerme	12	2	16.6
Maksutçuk	12	4	33.3
Söğütlü	12	2	16.6
Yücelen	12	3	25
<b>Total</b>	<b>108</b>	<b>27</b>	<b>25</b>

## DISCUSSION

Studies carried out in different provinces of Turkey showed that the seroprevalence of *B. equi* in horses are 4.49%-11.5% by microscopic examination of thin blood smears (1, 9, 10). The prevalence of *B. equi* has been found as high as 19.7% and 25.7%, as sera were tested by CFT and IFAT respectively (3). All these studies indicate that *B. equi* is seen in almost each region of Turkey although prevalence of the disease shows differences among the towns located in region with

different endemic features. These differences may be related to management practices and due to a difference in the prevalence of tick vector for *B. equi* between these regions, where climatic factors such as temperature, humidity and rainfall influence the habitat for ticks. The results presented here are in agreement with the IFA data reported by Balkaya (3).

It is generally accepted that diagnosis relying on clinical observations and occasional laboratory testing does not reveal the prevalence and epidemiology of diseases (17). The CF and the IFA are commonly used techniques for detection of antibodies to *B. equi* (17, 20). The IFA has been shown to be a more sensitive test than CF or conventional ELISA (4, 7, 15, 18, 19).

In the present study horses are seemed to be healthy, thus it was not completely understood how babesiosis in these animals could have been occurring. The large number of clinically healthy animals testing positive suggest that disease may have arisen from a sub-clinically infection, perhaps precipitated by some factor such as strenuous exercise (6).

We found that the prevalence of *B. equi* infection in horses in the province of Kars was 25%. This is probably related to the prevalence and intensity of tick infestation in this region. Arslan et al. (2) reported that *Dermacentor marginatus* known to transmit *B. equi* (5) is common in Kars.

Tenter et al. (19) found no significant differences between age groups in the prevalence of *B. equi* infection. In the present study there were not sufficient data to compare between seroprevalence and age groups statistically.

Results obtained in this study contribute to understanding the prevalence of *B. equi* in Kars, Turkey. In conclusion, this survey indicates that animals should either be tested or prophylactically treated for *Babesia* infection prior to or entering the paddock from farms because a considerable of horse have become asymptomatic carriers of the parasite. Further studies are necessary to investigate the seroprevalence of equine babesiosis in the other regions of Turkey.

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