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Seroepidemiological survey of *Rhodoccocus equi* infection in asymptomatic horses from Bursa, Izmir and Istanbul provinces, Turkey

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Abstract

In order to assess the *Rhodococcus equi* infection in three provinces of Turkey (Bursa, Izmir and Istanbul), 696 sera from healthy foals and adult horses were tested by indirect ELISA using a *R. equi* reference strain (ATCC 6939) as antigen. 103 sera (14.80%) with titres >0.646 resulted positive. Seroprevalence was significantly higher ($P = 0.0053$) in male than in female horses of Istanbul province, although higher antibody titres (mean value) were observed in the female group of Bursa and Izmir provinces with differences estimated between provinces

Abbreviations: CI_{95}, Confidential interval; ELISA, Enzyme-linked immunosorbent assay; PBS, Phosphate buffer solution; OD, Optical density; OR, Odds ratio; SD, Standard deviation

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($P = 0.0002$). Seroprevalence was correlated with age: foals aged less than 1 year ($P < 10^{-4}$) and horses from 5 to 10 years old ($P = 0.018$) resulted more infected in Bursa and Izmir provinces. Our findings indicate that *R. equi* infection actually occurs in all investigated provinces, suggesting the importance of serological survey to diagnose the infection and to prevent the zoonotic risk.

Keywords: *Rhodococcus equi*; Horse; ELISA; Turkey

Résumé

Afin d'évaluer la séroprévalence de *Rhodoccocus equi* dans trois provinces de la Turquie(Bursa, Izmir et Istanbul) un test ELISA a été réalisé sur 696 échantillons de sang prélevés chez des poulains et des chevaux asymptomatiques en utilisant l'antigène *R. equi* (ATCC6939). 103 sérums (14.80%) se sont révétés positifs à un titre supérieur à 1/646. Les taux de prévalence plus élevés ont été retrouvés ($P = 0.0053$) chez les mâles plutôt que chez les femelles dans la province d'Istanbul. Cependant, le groupe des femelles issues de la province de Bursa et d'Izmir a présenté des titres plus élevés avec des différences entre les provinces ($P = 0.002$). La séroprévalence était corrélée avec l'âge: les poulains âgés de moins d'unan ($P < 10^{-4}$) et les chevaux de 5 à 10 ans ($P = 0.018$) ont été les plus infectés dans les provinces de Bursa et d'Izmir. Notre étude montre que l'infection par *Rhodoccocus equi* existe dans toutes les provinces examinées, suggérant l'importance de la surveillance immunologique pour le diagnostic et la prévention du risque zoonotique.

Mots Clés: *Rhodoccocus equi*; Chevaux; ELISA; Épidémilogie; Turquie

1. Introduction

Rhodococcus equi is a pleomorphic, Gram-positive, facultative intracellular pathogen and causes chronic suppurative bronchopneumonia in young horses [1,2]. Foals less than six months old are the most susceptible in consequence of the decrease of colostral antibodies and an immature immune response. *R. equi* causes serious economic loss into Thoroughbred herds with enzootic infection and where horses are relatively crowded [1,3]. The microorganism is ubiquitous in the environment where herbivore manure and warm temperatures provide ideal conditions for multiplication. Nevertheless most foals, ranging from 4 to 12 weeks of age, show clinical signs with a morbidity rates between 5% and 17% and high mortality between 40% and 80% [4–6]. The disease is not diagnosed in adult horses even in endemic farms where environmental exposure is high [7,8].

Infection is distributed worldwide, but it is quite rare in other animal species except for pigs and immunocompromised human beings [9–11]. *R. equi* have been reported occasionally in cattle, goats, llamas, dogs, cats and wild animals, but only as opportunistic bacteria [5,8]. The incidence of pneumonia due to *R. equi* infection appears to be increasing in all breeds [11,12].