

RESEARCH ARTICLE

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Serosurvey for selected pathogens in Iberian roe deer

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Abstract

Background: The roe deer is the most abundant and widespread wild Eurasian cervid. Its populations are expanding and increasingly in contact with livestock. This may affect the distribution of infectious diseases shared with other wild and domestic ungulates.

Methods: We investigated the antibody seroprevalence against Pestivirus, Herpesvirus, Bluetongue (BT) virus, *M. avium paratuberculosis* (MAP), and *Brucella* sp. in 519 roe deer from different regions in Spain, south-western Europe.

Results: No antibodies were detected against BT and *Brucella* sp. However, antibodies were detected against Pestivirus (1.5%), Herpesvirus (0.2%) and MAP (9.2%). MAP antibodies were detected in seven of the eight populations (range 5-16.4%).

Conclusions: The detection of MAP antibodies in samples from most roe deer populations suggests that contact with MAP is widespread in this wildlife species. The highest prevalence was detected in sites with abundant dairy cattle and frequent use of liquid manure on pastures. Considering the results obtained regarding exposure to different pathogens, we suggest that antibody prevalences in this non-gregarious browser are largely determined by environmental factors, potentially modulating vector populations or pathogen survival in the environment.

Background

Interactions between domestic and wild ungulates represent a potential problem in epidemiology [1], but little is known about the role of roe deer (*Capreolus capreolus*) in some diseases of concern in livestock. The roe deer is a Eurasian wild cervid whose populations have been expanding during the last decades across Europe, both in density and in geographical range [2,3]. These demographic and geographic changes may increase the risk of acquiring new diseases through both increased contact rates with other species, and increased intra-specific contact and density-dependent impact on individual fitness at higher densities [4,5]. Expansion of roe deer may have an influence in the epidemiology of several infectious diseases potentially shared with other native wild ungulates, domestic ungulates, and even human beings [1].

In Europe, several serologic surveys have been carried out in order to investigate the sanitary status of roe deer

in different countries and situations. These surveys have reported on Pestivirus and Herpesvirus, paratuberculosis and other bacterial diseases, and protozoa mainly including *Toxoplasma gondii* and *Neospora caninum*. However, only limited knowledge exists regarding diseases of roe deer from the Iberian Peninsula.

Infections with bovine viral diarrhoea virus (BVDv), a Pestivirus, are widespread throughout the world. Although infection prevalence varies among surveys, the infection tends to be endemic in cattle, reaching a maximum level of 1% persistently infected (PI) and 60% antibody positive cattle. PI cattle are the main source for transmission of the virus [6]. In the US, white-tailed deer (*Odocoileus virginianus*) can get infected from cattle and give birth to PI fawns that may interfere with control programs [7]. In Europe, BVDv-like Pestivirus was isolated from two seronegative roe deer in Germany [8] and 12% seroprevalence was found in roe deer from Norway [9]. However, no Pestivirus seropositive roe deer were found in several recent surveys in Germany [10], Austria [11] and Italy [12,13]. Two studies carried out in the Spanish Pyrenees showed no antibody

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