

# Presence of *Angiostrongylus vasorum* in dogs in one of the largest regions of the Iberian Peninsula and Europe

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## INTRODUCTION

*Angiostrongylus vasorum* is the causative agent of canine angiostrongylosis, a disease affecting domestic and wild canids. In Europe it is an emerging disease, mainly reported in red foxes. Currently, angiostrongylosis is considered an emerging disease in many European countries, e.g. Germany, France, Greece, Italy, Romania, Sweden, Turkey, UK, Denmark, Portugal, Hungary, Ireland and Switzerland. In Spain, there are very few studies addressing the epidemiology and pathology of *A. vasorum* and most of them have reported the presence of this parasite in wild hosts such as wolves, foxes and badgers in different autonomous communities (Asturias, Aragón, Galicia, Castilla y León, Catalonia, Murcia and the Basque Country). Moreover, there is only one study addressing the epidemiology of the disease in dogs in Spain, with a mean prevalence of 1.73%. Being aware that Castilla y León, one of the largest regions in Europe, with vast climatological and orographic diversity, lacks epidemiological studies, the aim of this study has been focused on the analysis of the prevalence and distribution of *A. vasorum* in dogs living in this territory.

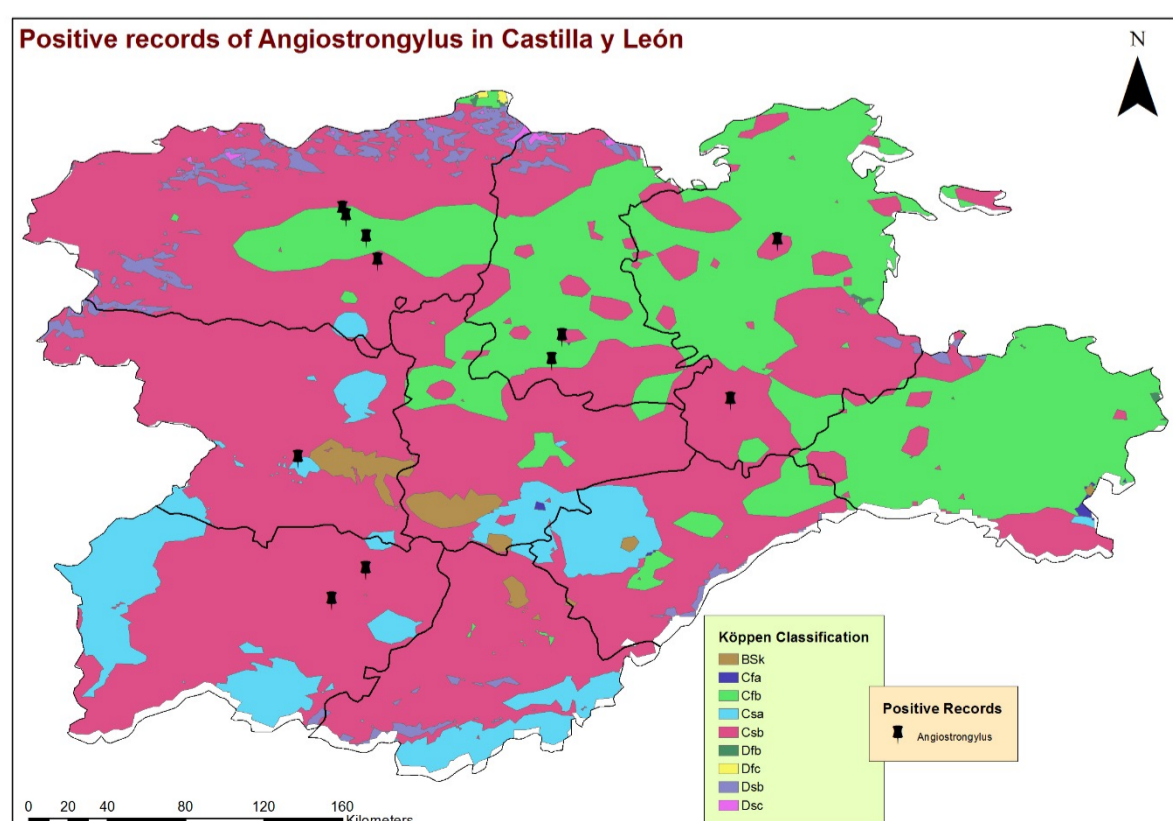
## MATERIALS AND METHODS

Castilla and Leon is an autonomous community of Spain, located in the northwestern quadrant of the Iberian Peninsula. Its extensive area of 94,224 km<sup>2</sup> makes it the largest autonomous community, region or district in Europe, and even exceeds seven of the fifteen member countries of the European Union. From September 2019 to December 2020, a total of 1475 serum samples from domestic dogs. Age at presentation to the clinics, breed, sex and habitat were recorded for each dog. All samples were tested for the presence of circulating antigens of *A. vasorum* using Angio Detect™ (IDEXX Laboratories Inc.; Westbrook, Maine, USA). Descriptive analysis: Chi-square and Fischer exact tests to compare proportions were performed. Confidence interval (95% CI) values were also calculated. A map of the sampling area was constructed using ArcMap v.10.8 (ESRI, 2020 Redlands, California, USA), including the following layers of environmental information that have been considered to be relevant for the dynamics of the analyzed organisms and their transmission vectors.

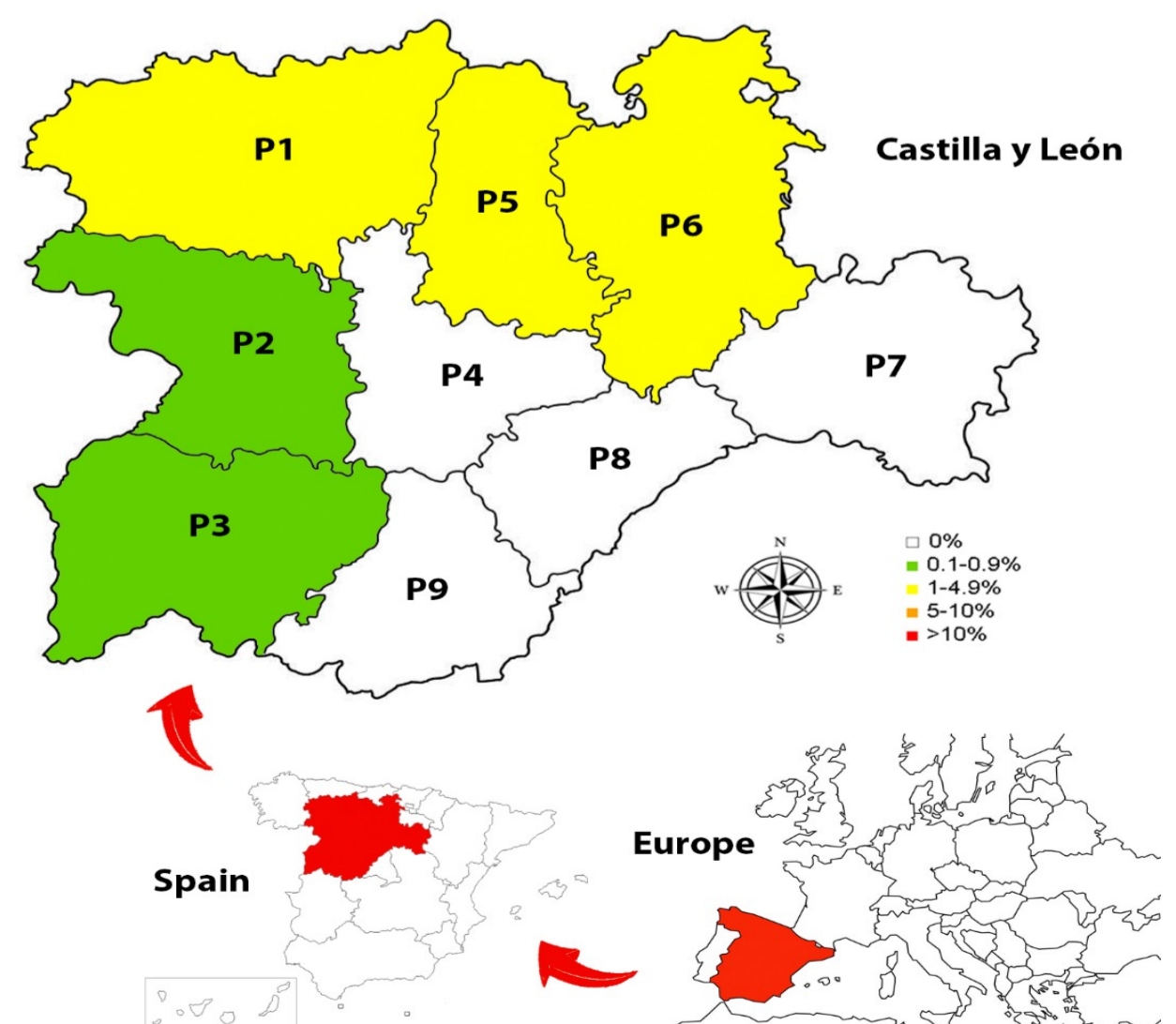
## RESULTS AND CONCLUSIONS

The location of infected dogs and the highest prevalences corresponded mostly with sub-climates characterized by mild summers and cold winters but above 10°C, that in the bioclimatic context show a trend towards a less seasonal character with an oceanic influence, moderate temperatures and greater precipitation. All infected dogs were located in areas with high presence of water or soil humidity, such as stagnant water, irrigated lands or river banks which would favor the presence of the intermediate host.

Furthermore, the prevalence was higher in outdoors dogs, being mainly guard and hunting breed dogs.. As angiostrongylosis is an emerging disease in Europe and, in particular, in Spain, prevention and control measures are important.



**Figure 2.** Geolocation of dogs infected by *Angiostrongylus vasorum* and the different climatologies according to Köppen's climate classification.



**Figure 1.** Prevalences of *Angiostrongylus vasorum* in the 9 provinces of Castilla y León, Spain: (P1): León; (P2): Zamora; (P3): Salamanca; (P4): Valladolid; (P5): Palencia; (P6): Burgos; (P7): Soria; (P8): Segovia; (P9): Ávila.