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Police dogs from Albania as indicators of exposure risk to *Toxoplasma gondii*, *Neospora caninum* and vector-borne pathogens of zoonotic and veterinary concern

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ABSTRACT

Knowledge on the prevalence of the zoonotic and animal pathogens in dogs from Albania is thus far limited. Samples were collected from 119 police dogs which were deployed throughout Albania and which were living in close relationship with humans. Direct and/or indirect methods were used to examine 119 whole blood and 117 serum samples for the protozoans *Toxoplasma gondii* (IFAT) and *Neospora caninum* (IFAT), various vector-borne pathogens of zoonotic and veterinary concern (SFG rickettsiae [ELISA, IFAT], *Anaplasma* spp. [PCR, IFAT], *Ehrlichia canis* [PCR, IFAT], *Babesia* spp. [PCR, IFAT], *Leishmania infantum* [PCR, IFAT], *Hepatozoon canis* [PCR], *Dirofilaria immitis* [ELISA]), and haemotropic mycoplasmas [PCR]. DNA of *L. infantum* and *Anaplasma platys* was detected in the blood of four and two dogs, respectively, but all samples were negative for DNA of *E. canis*, *Babesia* spp., *H. canis* and haemotropic mycoplasmas. *D. immitis* antigen was detected in 11.2% of the serum samples. The overall seroprevalences were: SFG rickettsiae (ELISA), 71.5%; *Rickettsia conorii* (IFAT), 61.5%; *T. gondii*, 65.0%; *Anaplasma* spp., 31.6%; *E. canis*, 17.9%; *L. infantum*, 12.0%; *N. caninum*, 12.0% and *Babesia canis*, 3.4%. Seven dogs were PCR-negative and seronegative for all tested pathogens. Significantly more dogs from South Albania (24.3%) had antigen of *D. immitis* than dogs from North Albania (5.4%, $p = 0.046$). There was no difference in the geographical distribution of exposure to any other pathogen. Age was found to be a risk factor ($p < 0.05$) for exposure to *T. gondii*, SFG rickettsiae, *Anaplasma* spp. and *L. infantum*. Co-exposure to up to five vector-borne pathogens was found in 51.5% of the 103 dogs that were seropositive for at least one vector-borne pathogen. Results of this study indicate a considerable risk of infection for dogs and/or humans with *T. gondii* and *N. caninum* and a range of zoonotic vector-borne bacterial and protozoan pathogens.

1. Introduction

Vector-borne infections are of growing concern for human and canine health worldwide. Climate and environmental changes affecting the occurrence and abundance of vectors as well as travelling with dogs and their translocation from endemic regions into non-endemic regions are discussed as possible reasons (Beugnet and Marié, 2009). In the year 2011, Albania was recommended as one of the top travel destinations worldwide by the 'lonely planet', so an increase of travel and tourism in the region can be expected over the coming years (lonelyplanet, 2011). Baseline data on the presence of and/or exposure to vector-borne pathogens in dogs from the whole country should be very helpful to monitor trends in the occurrence of vector-borne infections and thus estimate infection risks not only to travellers, pet-owners and veterinarians, but also to dogs and other animals (Beugnet and Marié, 2009). Until 2008, data regarding the occurrence of vector-borne pathogens other than *Babesia canis* and *Leishmania infantum* in dogs from Albania was lacking. Thereafter, the occurrence in dogs from Tirana and coastal areas of *Ehrlichia canis*, *Anaplasma* spp., *Hepatozoon canis* and *Dirofilaria immitis* was reported (Lazri et al., 2008, Hamel et al., 2009, Rapti and Rehbein, 2010). The occurrence of several vector-borne pathogens as well as *Mycoplasma haemocanis* and antibodies against *Toxoplasma gondii* and *Neospora caninum* in the blood of client-owned dogs under veterinary care from Tirana was reported recently only (Hamel et al., 2016). Most vectors of these pathogens benefit from the typical Mediterranean climate of the coastal lowland of Albania facing the Adriatic and Ionian Seas. However, 70% of the territory of Albania is mountainous with continental climate

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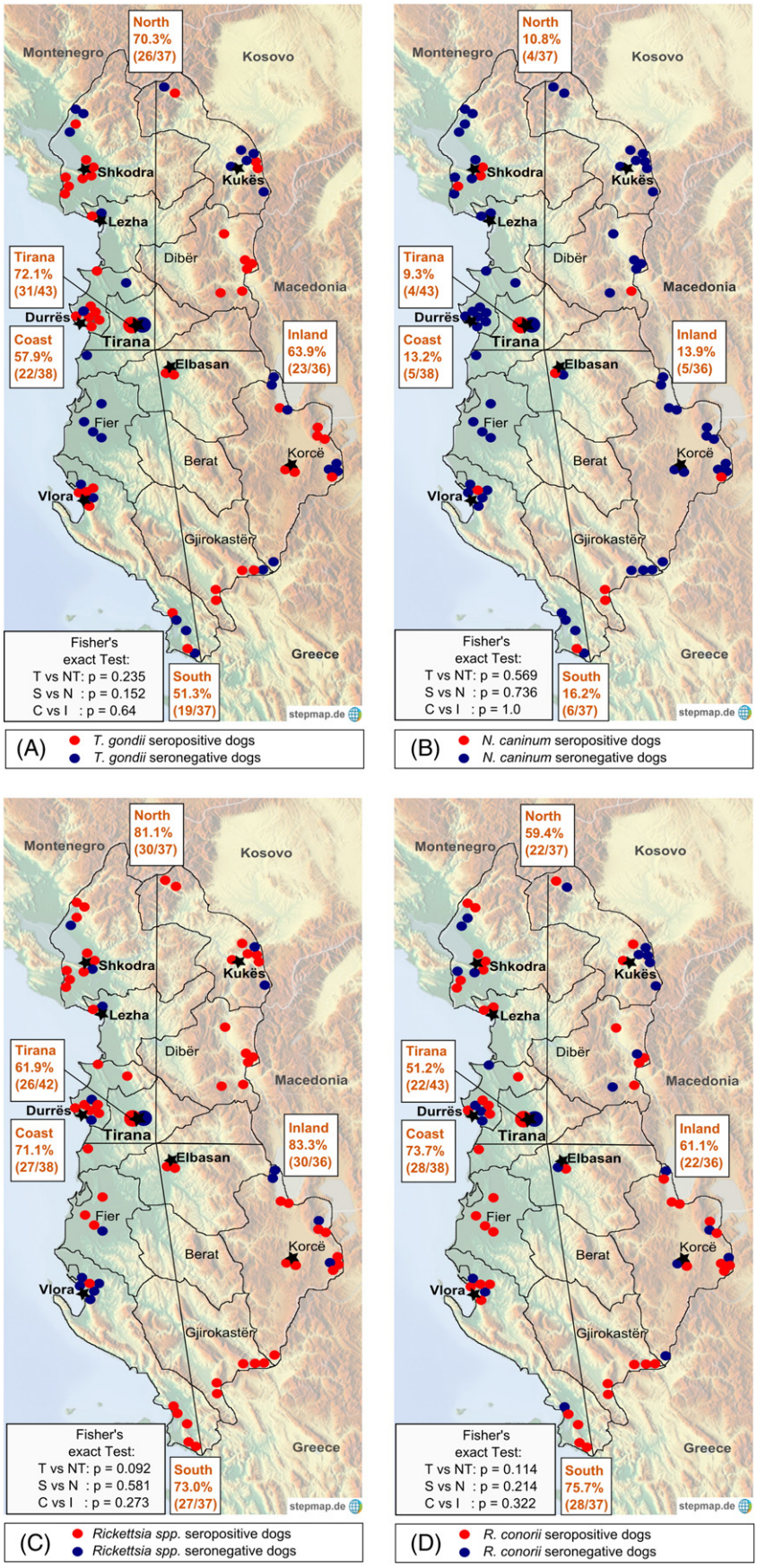

Fig. 1. Geographic distribution in Albania of the police dogs tested for antibodies to *Toxoplasma gondii*, *Neospora caninum*, SFG rickettsiae and *Rickettsia conorii*. Black lines divide non-Tirana (NT) Albania into areas – south Albania (S) + north Albania (N) or coastal Albania (C) + interior (I) – while dogs based in the city of Tirana (T) form a separate group. Prevalence of exposure was analysed as follows: T vs. NT, S vs. N and C vs. I.