Parasites & Vectors

RESEARCH

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Leishmania infantum and *Dirofilaria immitis* infections in Italy, 2009–2019: changing distribution patterns

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Abstract

Background: For long time, canine leishmaniosis (CanL) was considered endemic in the southern, central, and insular regions of Italy, whereas heartworm disease (HW) caused by *Dirofilaria immitis* was considered endemic in the northern region and in the swampy Po Valley. Following the reports of new foci of both diseases, in this study we update the distribution patterns and occurrence of new foci of CanL and HW discussing the main drivers for the changes in the epidemiology of these two important zoonotic canine vector-borne diseases.

Methods: Based on the statistical analyses of serological assays ($n = 90{,}633$) on *L. infantum* exposure and *D. immitis* infection performed by two reference diagnostic centres in Italy over a ten-year period (2009–2019) irrespective of the anamnesis of dogs. The distribution patterns of both parasites are herein presented along with the occurrence of new foci.

Results: Results highlighted the changing distribution patterns of *L. infantum vs D. immitis* infection in Italy. CanL is endemic in some areas of northern regions and HW has endemic foci in central and southern regions and islands. Significant differences in *L. infantum* exposure and HW infection prevalence among the study macroareas were detected. The overall results of the positive tested samples were 28.2% in southern Italy and islands, 29.6% in central Italy and 21.6% in northern Italy for *L. infantum* and 2.83% in northern Italy, 7.75% in central Italy and 4.97% in southern Italy and islands for HW. HW positivity significantly varied over years ($x^2 = 108.401$, $df = 10$, $P < 0.0001$), gradually increasing from 0.77% in 2009 to 8.47% in 2016–2017.

Conclusions: New potential epidemiological scenarios are discussed according to a range of factors (e.g. environmental modifications, occurrence of competent insect vectors, transportation of infected animals to non-endemic areas, chemoprophylaxis or vector preventative measures), which may affect the current distribution. Overall, the results advocate for epidemiological surveillance programmes, more focussed preventative and control measures even in areas where few or no cases of both diseases have been diagnosed.

Keywords: *Aedes* mosquitoes, Canine vector-borne diseases, *Dirofilaria immitis*, *Leishmania infantum*, Sandflies