Seropositive dog for *L. (L.) infantum*-overlapping spatial distribution of cutaneous disease

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Dear Editors,

Our previous study of spatial and simultaneous Leishmania spp. distribution in southern Brazil has shown higher exposure of dogs when compared to their owners, besides association of seropositive dogs to households up to 500 meters from the city railroad tracks (Preventive Veterinary Medicine, volume 154, pages 47 to 53, 2018). Despite considered a free area at the time of survey, authors have alerted that favorable conditions and sand flies could predispose a future occurrence of canine visceral leishmaniasis.

Testing the same serum samples collected at that time, a total of 12/729 (1.65%) dogs were initially positive after screened for anti-L.(L.) infantum antibodies by a rapid reference chromatographic immunoassay (DPP Dual Platform ®, Fiocruz, RJ, Brazil), followed by one confirmed and one inconclusive sample by an enzyme-linked immunosorbent assay (EIE-ELISA) (Biomanguinhos®, Fiocruz, RJ, Brazil), both performed at the Adolf Lutz Institute, a National Brazilian Reference Laboratory.

The protocol herein has complied with the CVL Diagnostic Guide used by the Brazilian Ministry of Health for diagnosis and euthanasia of positive dogs (Brasil, 2011).

The DPP® test was designed for detection of the recombinant rK28 antigen, assembled by rk9, rk26 e rk39 antigens of L. (L.) infantum, developed as a rapid and reliable diagnostic tool for detection and control of Visceral Canine Leishmaniasis (VCL). Sensibility and specificity reached 93.8% and 56.4% in symptomatic and 75.0% and 72.9% in asymptomatic dogs, respectively (Figueiredo et al., 2018). Despite a low sensitivity of 11.59%, the EIE-ELISA test has shown a specificity of 90.74% in asymptomatic dogs (Teixeira et al., 2019). In the same study, combination of DPP as screening, followed by EIE-ELISA as confirmatory test, has shown 10.14% of sensibility and 100% specificity.

Since the focus of the original study has been an epidemiological serosurvey of owners and their dogs, no tissue samples were collected at the time for molecular testing. However, further studies on lymph nodes and bone marrow samples should be
conducted to fully establish and characterize the *Leishmania* species involved on canine cutaneous leishmaniasis.

As result, this is the first report of an autochthonous case of seropositivity for *L. (L.) infantum* in a dog from Londrina, the second biggest state city with a population of half a million people, ranked 18th in population and 145th in human development index (HDI) out of 5,570 Brazilian cities and considered free of both canine and human visceral leishmaniasis.

Out of the initial 12 suspicious samples, no dog was previously seroreactive for cutaneous leishmaniasis the original study or presented clinical signs at the time of sampling, comprising five males and seven females, with no repellent collar, ages from six months to 12 years, four with no outdoor access and five with access to woody areas. Among these dozen suspicious cases, only one owner was positive for cutaneous leishmaniasis in the previous study. The only confirmed dog was a spayed female of three years of age, asymptomatic, with sporadic outdoor access and no access to woody areas or hunting habits, belonging to a negative owner. Cutaneous leishmaniasis was not linked to *L. (L.) amazonensis* or other cutaneous species since no molecular identification and characterization were made to date in that area.

Despite dispersion of visceral leishmaniasis remains to be fully established, detection of canine cases may precede human cases. Two main routes have been proposed for *L. (L.) infantum* entry at the Parana state indene areas: first by the continuous human and animal transit through the bordering states of Santa Catarina, São Paulo and Mato Grosso do Sul, all endemic for leishmaniasis and the latest two also by the environmental impact of an international pipeline and later road throughout Bolivia (Pasquali et al., 2019); and second from the three-border of Brazil, Paraguay and Argentina, located on the far-western city of Foz do Iguaçu, where the first canine and human cases of the Parana State were recently reported (Thomaz-Soccol et al., 2018).

Besides, all seropositive samples including the confirmed and inconclusive cases were located nearby the railroad, overlapping cutaneous *Leishmania* spp. Distribution.
These findings have corroborated to previous findings of visceral leishmaniasis dispersion along railroads (Sevá et al., 2017) and higher prevalence of dog infection in peri-urban areas (Michelin et al., 2018).

The results herein have shown that first seropositivity cases of *L. (L.) infantum* in dogs have occurred in overlapping areas of cutaneous leishmaniasis, likely due to presence of vectors and favorable conditions for both pathogens. Further studies should be conducted to identify potential vectors, since at the Tiger Island, Honduras, a total of nine *Lutzomyia* species were found co-habiting a region of overlapping visceral and cutaneous leishmaniasis cases (Mejía et al. 2018).

Interestingly, despite previously negative for cutaneous leishmaniasis, 6/12 suspicious samples were closely located to each other, similarly to findings of a *Lutzomyia longipalpis* behavior study, in which the maximum distance reached in urban setting was 241 meters within 14 days. Low dispersion herein may be also consequence of attractive local presence of accumulated water and shelter due to precarious hygiene conditions, besides blood supply of domestic animals (Oliveira et al., 2013).

Thus, the geolocation of a potential *Leishmania* spp. reservoir may provide basis for local serosurvey and phlebotomine capture, leading to a more effective detection, control, and prevention of visceral leishmaniasis, particularly in indene areas.

In conclusion, positive areas and not positive samples for cutaneous leishmaniasis should be further tested and constantly monitored for *L. (L.) infantum*.

**Funding acknowledgement**

Dr. Benitez has been supported by a PhD fellowship and research funding from Capes/CNPq through the Graduate College in Animal Sciences at the Londrina State University.

**References**


