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The eco-epidemiology of cutaneous leishmaniasis caused by *Leishmania tropica* in the city of Tubas in Palestine

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Background: Leishmaniasis is still considered as a neglected disease by the World Health Organization. We are applying an eco-health approach that integrates public health measures, epidemiology, and disease ecology to study CL caused by *L. tropica* in the West Bank. This study aims to evaluate the density of sand flies within an urban landscape and between the urbanized area and adjacent hyrax colonies.

Material/methods: The study was conducted in Tubas District, located in the northeast part of the West Bank. There, we conducted sand fly trapping in a hot spot for Leishmania infections in July and September, 2016. We examined the effect of distance from hyrax colonies by quantifying sand fly abundance along three 0.5 km long trapping transects running from a rocky area containing hyrax colonies out across an area of inhabited houses. Five traps were placed along each transect, with 100 m between traps. Two 6-night trapping sessions were conducted using CDC light traps. The trapped sand flies were counted, and each fly was sexed and identified to species. *Leishmania* parasite detection was conducted on the phlebotomus females using PCR amplification of the internal

transcribed spacer (ITS1), and the blood from recently consumed meals identified to species using the Cytochrome b PCR and Reverse Line Blotting (RLB) technique.

Results: A total of 1,051 *Phlebotomus* sand flies from 9 species were captured, of which 470 (5.2 per trap/night) were captured in July, and 581 (6.5 per trap/night) were captured in September. These included individuals of *Phlebotomus sergenti* (the most common), *Phlebotomus alexandri*, *Phlebotomus arabicus*, *Phlebotomus perfiliewi*, *Phlebotomus syriacus*, *Phlebotomus papatasi*, *Phlebotomus tobbi*, *Phlebotomus kazruni*, and *Phlebotomus simici*. Sandflies were captured in greater numbers (presumably reflecting higher densities) in stations located in the periphery and edges facing the wadies of the study site close to hyrax colonies. Sandflies captured next to hyrax colonies were infected with *Leishmania tropica*.

Conclusions: Living next to the city edges, facing the wadies, open green areas, and close to host colonies increase the exposure to infected vector (sand-fly). This case study was conducted to quantify the distribution of sand fly vectors across their habitats. Such knowledge can allow us to better identify areas of greater risk of infection and to focus our efforts in particular areas to control sand flies and encourage behaviors in local residents that increase personal protection.