



Is developing an early warning system (EWS) for sand flies worth the effort?

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CLIMOS' initiative to bring together a large group of scientists and resources from Europe and neighboring countries to develop an early warning system for sand flies well deserves an explanation. In previous opinion articles my colleagues told us about sand flies. These small, blood-sucking insects thrive in warm climates and are expected to spread further due to climate change, along with the pathogens they carry. At the center of the problem is ***Leishmania***, a group of microscopic protozoan parasites that infect the immune cells of humans and animals.

Leishmania can infect a wide variety of hot and cold-blooded species, and it is **particularly lethal to some dogs and people**. Canine Leishmaniosis is a major concern in Mediterranean countries, where it affects dogs of all breeds and ages.

While treatment for *Leishmania* is available, diagnosing the disease can be tricky and **it often progresses too far before it's caught, causing serious damage to vital organs**. The problem is spreading beyond the Mediterranean, as dogs travel from infected regions, bringing the disease with them to places like central and northern Europe.

Humans are generally better at fighting *Leishmania* than dogs, but the disease still poses a risk. There are two main forms of human Leishmaniosis: Visceral Leishmaniosis (which is life-threatening if not treated promptly) and Cutaneous Leishmaniosis (which is more common and less severe). Visceral Leishmaniosis mainly affects malnourished children, and though it was once more common, recent outbreaks have affected people with weakened immune systems,

such as those with HIV or who have undergone organ transplants. Healthy adults in areas with high sand fly populations are also at risk.

Prevention is key to controlling Leishmaniosis. Vaccines are available for dogs, but they are expensive and not highly effective, as vaccinated dogs can still get infected and develop leishmaniosis. As a result, the focus is on preventing sand fly bites. Unlike mosquitoes, sand flies breed in protected areas on the ground, so controlling their breeding is difficult. Instead, efforts focus on using insecticides with a sand fly repellent activity on dogs, though this is neither a guaranteed solution. Limiting exposure to sand flies, especially during their peak activity from dusk to dawn, between late spring and early autumn, is also important. For example, using window screens with a small hole size or air currents from fans can help keep sand flies out.

In this context, an early warning system that provides timely information on where and when sand flies are most active would be highly beneficial for enhancing prevention efforts. This is a key goal of CLIMOS. To achieve this, data on sand fly distribution and seasonal patterns across various climatic zones in Europe and neighboring countries are being collected, using standardized sampling methods. Additionally, *Leishmania* infections in both sand flies and dogs living in the same area are investigated. This is also a major task within the project that will allow an assessment of the risk of infection.

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