

Sand fly barcoding in Panama reveals *Leishmania* strain and its potential control

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This light trap on Panama's Barro Colorado Island lures sand flies that carry leishmaniasis, as well as other insects. Credit: Provided by Dianne de la Cruz

In the first survey of sand flies in Panama to use genetic barcoding, scientists at the Smithsonian Tropical Research Institute and Gorgas Memorial Laboratories identified 20 sand fly species from Barro Colorado Island. Two species carried *Leishmania naiffi*, a parasite that causes cutaneous leishmaniasis: persistent, itchy skin lesions. Three species carried *Wolbachia*, a bacterial parasite of insects that could contribute to a strategy to control the flies and limit disease transmission.

"We used DNA barcoding—sequencing a particular gene of the blood-feeding flies we collected—to identify the 20 fly species; two species

could not be distinguished visually," said Don Windsor, a Smithsonian scientist, who collaborated with STRI interns Jorge Azpurua, Dianne de la Cruz and Anayansi Valderama. "By characterizing another gene fragment from the nucleus of *Leishmania*, we discovered which fly species carried this disease-causing trypanosome."

Leishmaniasis is not new in central Panama—it poses a long-standing health risk to residents and visitors in the region. *L. naiffi*, the species carried by the flies in this survey, was previously known only to be in the Caribbean and the [Amazon](#). "Other species of *Leishmania* and the blood-feeding flies that transmit them are endemic in central Panama," said Windsor. "Either *L. naiffi* was here undetected, or it could be a recent introduction carried by animals or people coming into Panama. Another explanation is that it is gradually moving northward from South America into Central America."



Traditionally, entomologists depended on characters like this male terminal segment to distinguish sand fly species. Because females (the vectoring sex) have less distinguishing morphological characters, this survey used the COI barcoding gene to confirm species identities. Credit: Don Windsor

Researchers hope that the presence of *Wolbachia* in the same species of flies that carry *Leishmania* may be useful in disease control. *Wolbachia* bacteria infect the flies and are passed readily from generation to generation. *Wolbachia* affects the flies' ability to reproduce and has been proposed as a possible biological control of other [insect pests](#).

Windsor emphasized that common preventative measures such as wearing insect repellent and long-sleeved shirts and pants when going out at dawn or dusk should be standard practice for residents, researchers and tourists who visit lowland tropical forests where *Leishmania* is endemic.

More information: The *Leishmania* study was published in the open access journal *PLoS Neglected Tropical Diseases*.

Provided by Smithsonian Tropical Research Institute

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