

## THE USE OF PHLEBOTOMINE SANDFLIES IN XENODIAGNOSIS

H.A. CHRISTENSEN and A. HERRER

Gorgas Memorial Laboratory  
Panama, Republic of Panama

### SUMMARY

Xenodiagnostic trials for the detection of trypanosomatid parasites were conducted using 3 laboratory-reared Panamanian sandfly species and freshly captured two-toed sloths, *Choloepus hoffmanni*. A total of 1,665 sandflies in lots of 10 or more females have been used to feed on 73 sloths. Flies from lots which fed on 36 (49 %) of these animals developed flagellate infections. *Endotrypanum schaudinni* was found to develop and multiply in all these sandfly species. However, a significant number of flies which fed on animals infected with a *rangeli*-like trypanosome failed to acquire the parasite.

### RÉSUMÉ

Pour réaliser des essais de xénodagnostic (Trypanosomatidés), on utilise 3 souches de Phlébotomes panaméens, élevées au laboratoire, et comme hôtes vertébrés, des Paresseux à deux doigts *Choloepus hoffmanni*, récemment capturés. Un total de 1.665 Phlébotomes, répartis en lots de 10 femelles, ont piqué 73 Paresseux. Les Insectes gorgés sur 36 hôtes soit 49 % ont développé une infection parasitaire. Le Trypanosome *Endotrypanum schaudinni* se développe et se multiplie sur toutes ces espèces de Phlébotomes. Par contre aucun Insecte gorgé sur des animaux infestés avec *Trypanosoma rangeli* n'a développé d'infection.

The Republic of Panama has been called the bridge of the Americas. This is true faunistically as well as geographically. The country shares a rich phlebotomine sandfly fauna indigenous to Central as well as South America. Of the 69 reported species, 20 have been found to feed on man in nature. Five of the latter species, however, account for approximately 98 % of our collections from human bait. Each of these 5 species has been incriminated as potential vectors of human cutaneous leishmaniasis in Panama.

### I. MATERIALS AND METHODS

Two of these sandflies, *Lutzomyia sanguinaria* and *L. gomezi*, have been maintained in closed colonies at Gorgas Memorial Laboratory (GML) for over 15 years. Laboratory-reared progeny of these species, as well as *L. trapidoi*, a third incriminated vector reared routinely

through several generations, were used in xenodiagnostic trials.

Freshly captured two-toed sloths, *Choloepus hoffmanni*, the principal reservoir host of *Leishmania braziliensis* in Panama, were secured to restraining boards. Lots of 10 or more of each of the 3 laboratory-reared sandfly species were released into a Barraud cage, fastened over the head of each animal (Fig. 1). Blood-engorged flies, held at 21-28 C in plaster of Paris-lined shell vials after each feeding trial, were dissected after oviposition. The intestinal tract of flies found positive for flagellates at the time of dissection were triturated and cultured on Seneckji's medium to determine the identity of the organisms.

### II. RESULTS

A positive xenodiagnosis for *L. braziliensis* from one animal using this technique was reported previously



FIG. 1. — Freshly captured two-toed sloth, *Choloepus hoffmanni*, restrained for a xenodiagnostic feeding trial. One side of the Barraud feeding cage, into which laboratory-reared sandflies are released, has been cut away for clarity of demonstration.

(CHRISTENSEN and HERRER, 1972). To date we have fed a total of 1,665 laboratory-reared sandflies of the three species mentioned on 73 sloths collected from central Panama. Flies from lots which fed on 36 (49%) of these animals developed flagellate infections. Infection rates of the flies from positive xenodiagnostic lots ranged from 4-100%, with a mean of 36%. In addition to the acquisition of *L. braziliensis*, thus far proven only for *L. gomezi*, all three sandfly species developed infections of *Endotrypanum schaudinni* following xenodiagnostic trials. The latter parasite multiplies rapidly within these sandfly species and persists long after the digestion of the infective blood meal. The vector potential of phlebotomines for transmitting *E. schaudinni* was suggested by SHAW (1964), as a result of his work in central Panama in cooperation with GML scientists.

The tissue biopsy-culture technique for the isolation of *Leishmania* (HERRER *et al.*, 1966), used in conjunction with our xenodiagnostic studies, showed that the animals in these trials had single or multiple infections with the following trypanosomatids: *L. braziliensis*, *E. schaudinni*, a *rangeli*-like trypanosome and *Trypanosoma cruzi*.

A significant number of sandflies which fed on animals infected with the *rangeli*-like trypanosome failed to acquire the parasite.

### III. CONCLUSION

The xenodiagnostic technique has proven useful as a screening method for the detection of *Leishmania*

*braziliensis* and *Endotrypanum schaudinni* in the reservoir host of these parasites. Information was also gained on trypanosomatid acquisition rates by potential vector species feeding on a natural reservoir. Growth patterns of the parasites in the intestinal tract of the sandflies were also recorded, since it is a factor to be considered in evaluating the vector potential of each phlebotomine species.

A complete tabulation of these data will appear in a forthcoming publication.

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