

## COMPARATIVE FLYING AND BITING ACTIVITY OF PANAMANIAN PHLEBOTOMINE SANDFLIES IN A MATURE FOREST AND ADJACENT OPEN SPACE<sup>1</sup>

In Panama, phlebotomine sandflies are characteristically forest insects and the disease agents transmitted by them (cutaneous leishmaniasis and several arbovirus infections) are normally contracted only by people living in rural areas or entering the forest for work or recreation (Johnson, 1968, *Amer. J. Trop. Med. Hyg.* 17: 819-22; Perata et al., 1965, *Amer. J. Trop. Med. Hyg.* 14: 146-51; Tesh et al., 1969, *Amer. J. Epidemiol.* 90: 255-61; Walton et al., 1968, *Amer. J. Trop. Med. Hyg.* 17: 19-24). Although principally rural in occurrence, sandfly-transmitted disease agents are a public health problem in both the Canal Zone and the Republic of Panama.

Application of insecticides to human dwellings or control of adult and immature sandflies in their natural habitat seems technically and economically unfeasible. One method of preventing sandfly-transmitted diseases is to avoid being bitten by these insects. However, in the humid tropics, protective clothing is uncomfortable, and insect repellents are of limited usefulness, since they afford only temporary protection and cause irritation to some individuals.

It has been our observation that the most effective way to avoid sandfly bites in a forested area during the night (dusk to dawn), when these insects are most active, is to remain in a cleared area. To substantiate these observa-

tions, we compared results obtained from human-bait and light-trap sandfly collections made in mature forest and in an adjacent open space (cleared area) (FIG. 1). All studies were done at the Limbo field station in the Canal Zone, an area of mature tropical forest described in detail previously (Chaniotis et al., 1971, *J. Med. Ent.* 6: 339-52). One battery-operated light trap was set about 1 m above the forest floor and a 2nd trap was placed at the same height 50 m away in the center of a cleared area (27 × 33 m). Both traps were operated simultaneously for 31 nights between April and November (wet season) of 1971. Biting sandflies were also captured from 2 human collectors exposed at ground level at the same 2 sites; total human collecting time represented 17 hr (1 hr each day from 7:00 to 8:00 pm during June, July and August of 1971).

Results of light-trap and human-bait collections are summarized in TABLE 1. The lack of overlap in catch values at the 2 sites eliminates the need for further statistical analysis of the raw data. The results demonstrate that flying (light-trap) and biting (human-bait) activities of anthropophilic sandflies in the open space were approximately 1/5 and 1/15, respectively, of the corresponding activities in the forest, 50 m away. Likewise, fewer zoophilic sandflies were trapped in the open space than in the forest. The disparity between light-trap and human-bait collections at the same site presumably reflects differences in the attractiveness of the 2 sampling methods for the various species.

Anthropophilic sandflies in the study area were pre-

TABLE 1. Phlebotomine sandflies (total number) collected in light-traps and from human-bait in 2 distinct biotopes in Panamanian forest.

Species	LIGHT TRAPS		HUMAN BAIT	
	Mature forest	Open space	Mature forest	Open space
<b>A. Anthropophilic species*</b>				
<i>L. gomezi</i>	10	3	0	0
<i>L. olmeca bicolor</i>	6	2	1	0
<i>L. panamensis</i>	74	30	22	2
<i>L. festuana</i>	17	2	165	1
<i>L. sanguinaria</i>	14	1	11	9
<i>L. tropidai</i>	119	16	27	2
<i>L. ylophiletor</i>	3	0	0	0
Mean	34.7	7.3	32.4	2.0
<b>B. Zoophilic species**</b>				
<i>L. aldydifeva</i>	393	114		
<i>L. confasi</i>	67	9		
<i>L. carpanteri</i>	132	14		
<i>L. gracielata</i>	15	0		
<i>L. trinidadensis</i>	6	2		
<i>L. triangula</i>	15	4		
<i>L. vesidifeva</i>	34	4		
Other (12 minor spp.)	22	3		
Mean	85.7	18.7		

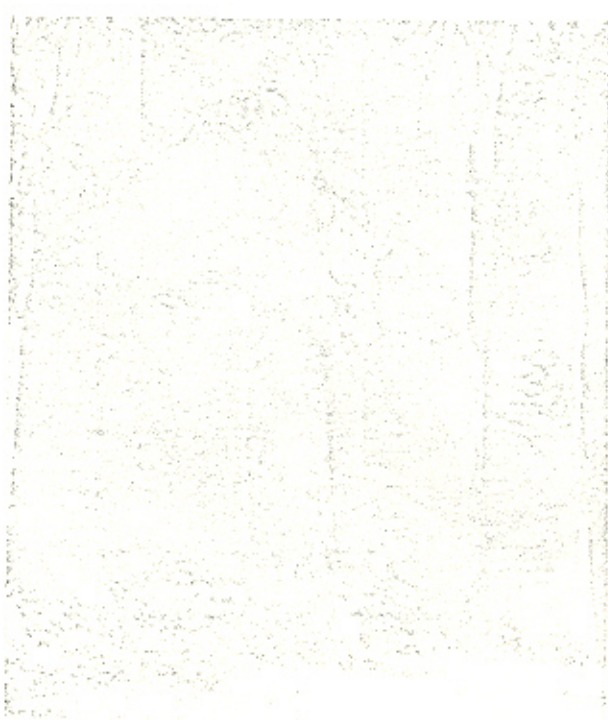


FIG. 1. Partial view of the open space and mature forest in the Limbo field station sites where sandfly activity was compared by means of light-traps and human-bait.

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\*Includes ♀ specimens only.

\*\*Includes both ♂ and ♀ specimens.

dominately *Lutzomyia trapidoi* (Fairchild & Hertig), *L. pessoana* (Barretto), and *L. panamensis* (Shaunon). Both *L. panamensis* and *L. trapidoi* have been found naturally infected with *Leishmania braziliensis* in Panama (Christensen et al., 1969, J. Parasitol. 55: 1090-91; Johnson et al., 1962, J. Parasitol., 48: 156), but *L. pessoana* has not been incriminated so far. In addition, a number of viruses belonging to the vesicular stomatitis, Changuinola, and Phlebotomus Fever groups have been isolated from *L. trapidoi*; a single isolation belonging to the latter group also has been made from *L. panamensis* (Tesh et al., unpubl. data).

The results of this study support our original observations and indicate that sandfly activity is greater within the forest; therefore, by camping in open spaces or by clearing an area around a dwelling, the risk of sandfly

bite is greatly reduced. It is possible that the difference in sandfly activity between forest and open space recorded in this study reflects the spotty distribution of these insects in tropical forest (Chaniotis et al., 1971, loc. cit.; Lewis, 1971, Bull. Wld Hlth Organ. 44: 535-51), and that the results may not be reproducible under comparable circumstances in another locality. We believe, however, that our conclusions are valid, based on our long-term experience in various Panamanian forests and the magnitude of the difference, which is unlikely to occur within 2 adjacent sites inside mature forest.—Byron N. Chaniotis, Gorgas Memorial Institute, Middle America Research Unit, Box 2011, Balboa Heights, Canal Zone; present address: Rocky Mountain Laboratory, NIH, NIAID, Hamilton, Montana 59840, U.S.A. and Manuel A. Correa, Gorgas Memorial Institute.